ENGINEERING NEWS-RECORD

DECEMBER 2, 1943

PRODUCTION LINE ASSEMBLY OF TANK LANDING CRAFT

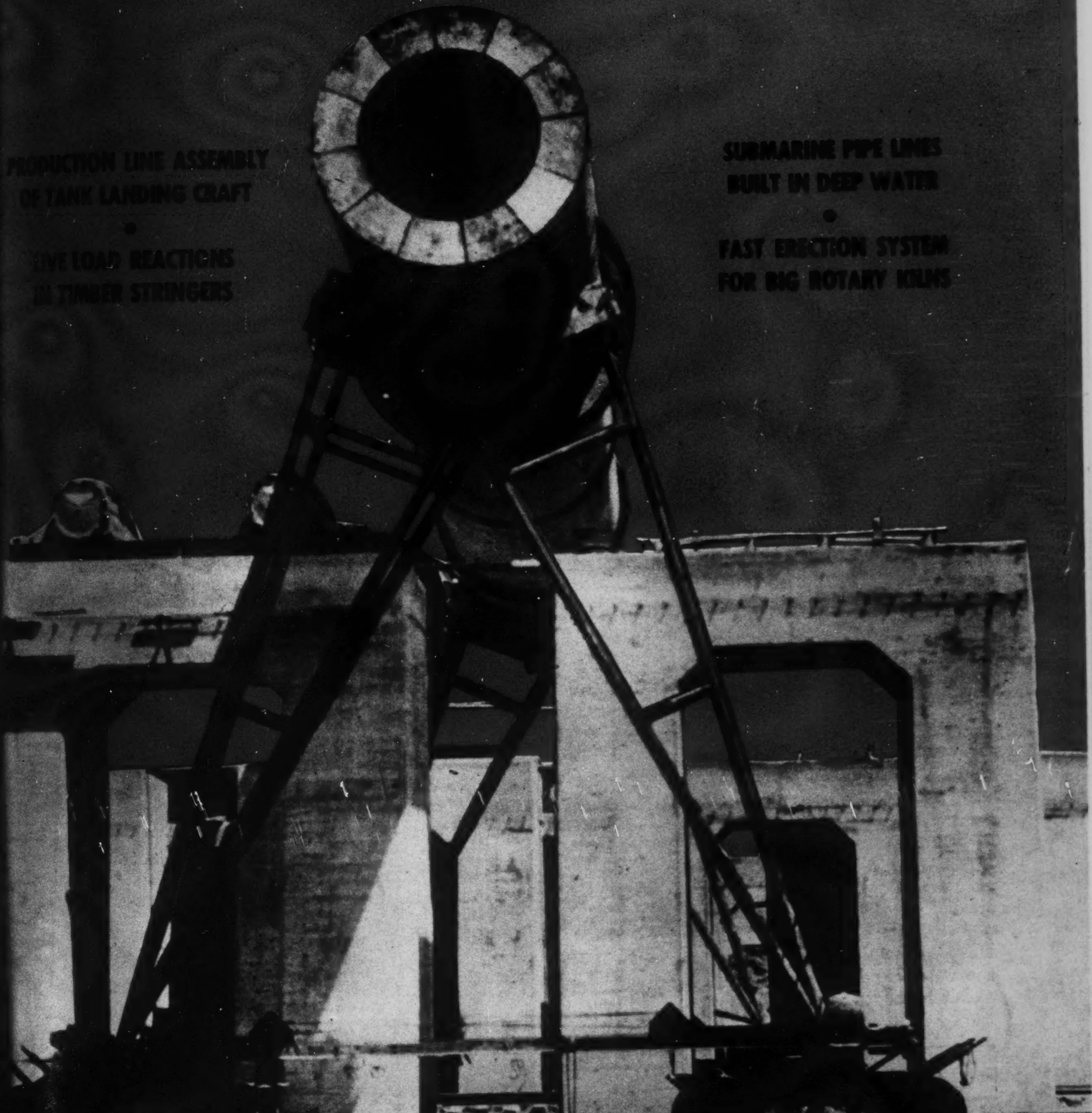
●

LIVE LOAD REACTIONS IN TIMBER STRINGERS

SUBMARINE PIPE LINES BUILT IN DEEP WATER

●

FAST ERECTION SYSTEM FOR BIG ROTARY KILNS



Unique scissors-leg rig is used to place 98-ft. long rotary kiln weighing 100 tons.—STORY ON P. [illegible]

BYERS RADIANT HEATING gets another war-time job

Naval Air-Station Dispensary

Byers Radiant Heating was again enlisted for military service when the new Naval Air Station Dispensary was built at Jacksonville, Florida. Two wards are warmed with pipe coils of Byers Wrought Iron, embedded in the concrete floor. The architects and engineers were Robert and Company, while Henley and Beckwith were the contractors and fabricators.

Coils are made up of 224 pieces of 1-inch Byers Wrought Iron pipe, each 22-feet long, welded to headers. The coils are pitched and vented, with provision for draining. Heating medium is water, warmed by a steam heat exchanger. Minneapolis-Honeywell thermostats control the temperatures.

This is the second Byers Radiant Heating Installation for the station; the first was in two chapels built about a year ago.

The widespread use of Byers Radiant Heating in all varieties of structures to meet all kinds of needs is the best evidence of its almost universal possibilities. Whether you are planning some essential structure for today, or are doing a little preliminary planning about tomorrow, radiant heating deserves a prominent part in your thinking.

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ENGINEERING NEWS-RECORD

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blication Office: 99-129 North Broadway, Albany 1, N. Y. • Editorial and Executive Offices: 330 West 42nd Street, New York 18
JOHN ABBINK, *Publisher*
WALDO G. BOWMAN, *Editor* **ALBERT E. PAXTON, *Manager***

Vol. 131 DECEMBER 2, 1943 No. 23

COMING NEXT

• With less than two years allowed for surveys, design and construction, and with practically no steel available for bridges, the work of relocating 24 mi. of the Southern Railway, made necessary by construction of TVA's Fontana Dam, makes this project of special interest. Some 300,000 cu.yd. of grading was required, with many fills rising to a height of 100 ft.; some extend more than 100 ft. into the fluctuating Fontana reservoir, thus calling for special care in their construction. See *ENR*, Dec. 16 for complete description of the project.

• One of the most difficult problems in construction of reinforced concrete buildings, particularly where large wall areas and parapets are called for in the design, is the prevention of unsightly cracks, or at least the control of their location. A simple, yet highly effective means of solving this problem was employed recently on two power plant structures. The method, procedure and sequence of placing the concrete will be described in the Dec. 16 issue.

• A new method of making reinforced concrete pressure pipe, employing the principle of prestressing steel in tension and concrete in compression, has resulted in a considerable saving in steel compared with the amount normally used for pipe of the same pressure design. On a recent job calling for 75,000 lin.ft. of 30-in. pipe the use of 1,000 tons of steel was eliminated. This advance in the art of pipe making will be described in *ENR* for Dec. 16.

LOOKING AHEAD

• A newly discovered method for winding commercial grades of wire around concrete tanks at stresses of 150,000 psi., will be described in an early issue. Using the high stress overcomes the loss of compression, caused by shrinkage and plastic flow in the concrete, a condition that cannot be overcome with rods, which it is impractical to stress in the field to much more than 40,000 psi. Steel savings of 75 percent are realized and cracks in the concrete are eliminated.

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Number of copies of this issue printed: 36,017

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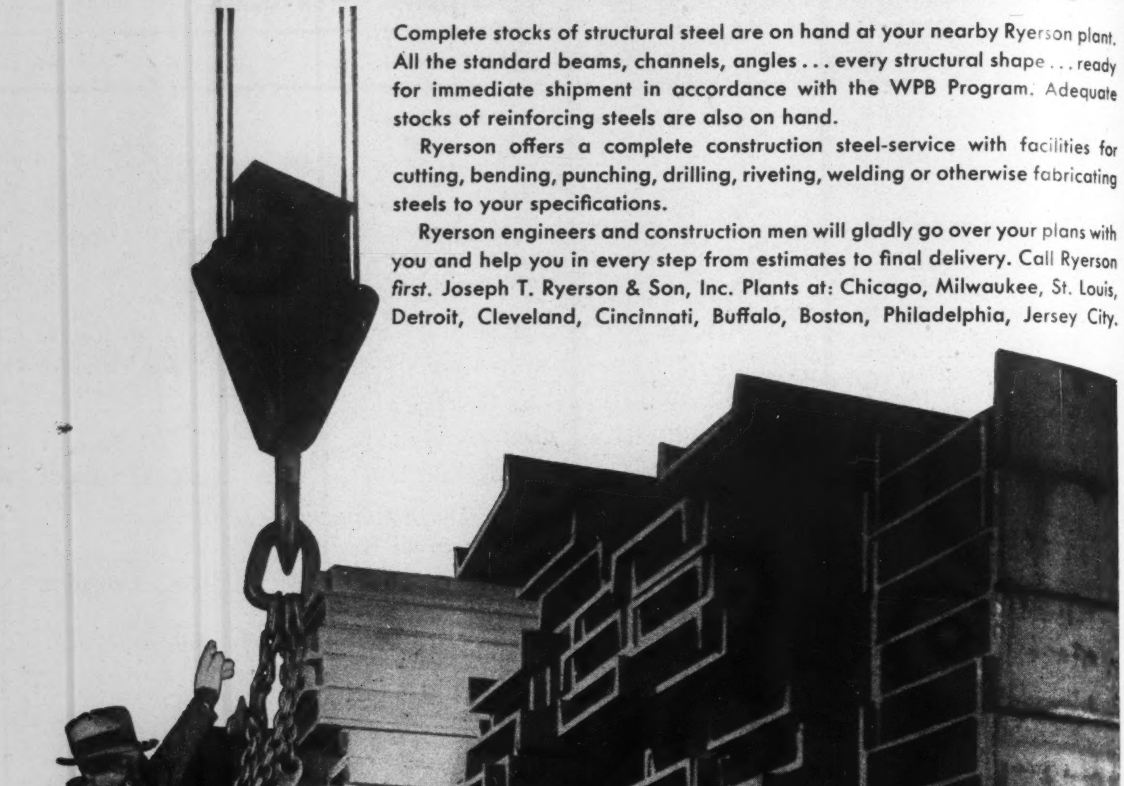


RYERSON STEEL-SERVICE

The Week In Engineering and Construction

NGINEERING NEWS-RECORD • DECEMBER 2, 1943 • VOLUME 131 • NUMBER 23

Postwar building problems are national, says Fleming

Federal Works Administrator warns Public Buildings and Grounds Committee of Congress against depending solely on local initiative for after-the-war projects

There are two reasons why it is unwise to rely exclusively on local initiative and responsibility for public works after the war, Maj. Gen. Philip B. Fleming, Federal Works Administrator, told members of the Public Buildings and Grounds Committee of the House at its opening session of hearings on postwar construction planning (*ENR* Nov. 25, p. 777). The first reason, he said, is that after-war problems will be national in scope, among the most pressing of which will be need of employment. The other, he went on, is "that while those communities possessed of adequate means and sufficient foresight, undoubtedly would have public-works jobs ready for their displaced war workers and returning soldiers, other communities, lacking either means or foresight, would not provide them." He believes the result would be that employment would be available to returning service men in one community, and not in the other.

Central control needed

"Moreover," Gen. Fleming added, "unless there is some kind of central control over these public construction activities, we run the risk of seeing any money that may be available for them surrendered to various pressure groups. In that event pet projects of all sorts would be put forth for instant attention, so that we might get monumental public auditoriums or grandiose football stadiums in towns that have a much greater need for sanitary sewage disposal or an improved water works."

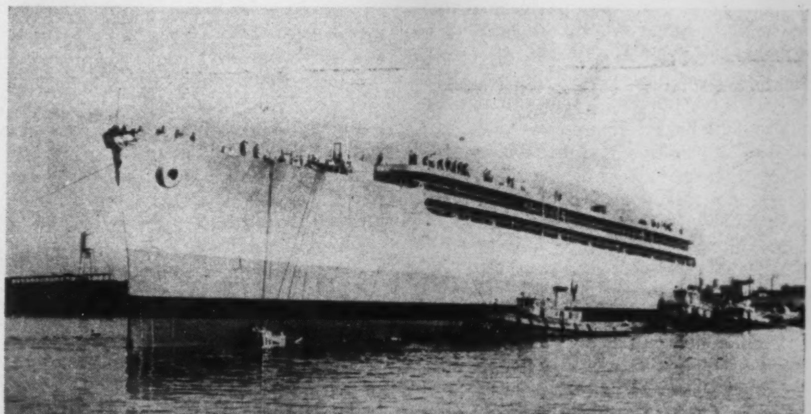
"My own preference is for a federal program of assistance in plan preparation. If there is such a program it would be possible to plan projects in those localities where they will be most urgently needed, both on their own account and for their employment-creating possibilities, and have them ready for the contractor on time. It would be possible to encourage public construction activities in places where reconversion may be long delayed, while holding off, or at least not encouraging, such activities in places where there will be little problem of reconversion and where large-scale public employment might actually delay recovery by competing with private business for men and materials. It would also be possible to plan both short-run and long-run programs, according to possible need. We would have, in short, a national program which could be used in such a way as best to assist the whole economy."

"It seems likely that the European phase of it (the war) will be finished before the Pacific phase. If so, our "post-war" problems will begin to pile up before we have decisively won in the Orient. For that reason, I think we cannot afford to lose a day unnecessarily in getting on with plans that include the blueprinting of post-war jobs."

• • •

Russian engineers here to study American roads

The two Russian highway engineers, N. Perelshtein and E. F. Kojevnikov, who are touring the United States as their government's representatives under lend-lease agreements, will be in Texas until November 28 to study maintenance methods and operations of the Texas Highway Department and the construction of Texas highways. With the Russian representatives as interpretor is Boris R. Petroff of the United States Public Roads Administration staff.



Large Navy repair ship launched

The U. S. S. Ajax, the largest ship ever built on the west coast by a civilian firm was recently launched at the San Pedro, Calif., yard of the Los Angeles Shipbuilding and Drydock Corp.

The huge floating repair ship has been called an "industrial city" with its shops equipped for the repair and maintenance of any fleet unit.

The vessel is 530 feet long and 72½ feet wide. Sufficiently fast to be able to come alongside damaged ships in time to make repairs while minutes count, the ship is armed sufficiently to defend itself in any emergency.

A sister ship of the U. S. S. Vulcan, the Ajax will be an even better ship than the Vulcan as many changes were made in the original plans since her keel was laid.

Postwar scarcity of young civil engineers predicted

An acute shortage of young civil engineers in the postwar period is predicted by Dean George F. Bateman of the Cooper Union Engineering School, New York City. The vast reconstruction program abroad alone will require more civil engineers than will be available, and the shortage will present a serious stumbling block to the domestic building boom expected after the war, in the opinion of Dean Bateman.

"For the past ten years enrollments in civil engineering departments in schools throughout the country have been lower than in any other branch of engineering," Dean Bateman says. "Because of the great restriction in building construction during the depression, students have flocked to other fields, such as electrical and chemical engineering, which seemed to offer greater current opportunities.

"This trend is still continuing unabated despite the fact that there is a big reconstruction period coming, and civil engineers will be in greater demand than any other type."

Dean Bateman warns that this shortage will become increasingly serious as the war continues. "While many engineers are being trained under the Navy and Army college programs, they are mostly in other branches which are of immediate wartime use to the armed forces," he says. "In addition, the type of instruction civil engineers receive under the Army is not adequate for civilian needs and a retraining program will be necessary before they can undertake peacetime work.

"War developments in fabrication and the long period preceding and during the war when construction was at a standstill will create an unprecedented demand for the replacement of outmoded and worn structures.

"There will also be the task of reconverting industries to a peacetime basis and modernizing backward communities which will have to improve their mode of living if they expect to hold their population. This will entail the building of water and sewage systems, new roads and other facilities which require civil engineering. The increased place of aeronautics in civilian transportation will create another demand for civil engineers to build airports and landing fields."

More adequate vocational counseling to encourage young men into civil engineering will have to be developed if this shortage is to be overcome, Dean Bateman declares. "While engineering schools are busily planning curricula for the training of new men and supplementary programs to round out the education of veterans, no plans are being made to divert students into those fields where they are most needed," he states. "Students are continuing to elect those branches in which there is a wartime boom, not planning for the future."

Pennsylvania Contracts Parkway Design

Pennsylvania's great postwar road-building program got under way this week when Daniel Shroyer, secretary of the Pennsylvania Department of Highways, executed a $375,000 contract for the survey and preparation of plans for the construction of the Penn-Lincoln Parkway in Pittsburgh. The highway, variously spoken of as a $15,000,000 to $20,000,000 project, will lead directly to the city from the east, serving to relieve Pittsburgh's tangled traffic situation.

Michael Baker, Jr., construction engineer of Rochester and Pittsburgh, Pa., who was awarded the contract, will complete the survey and plans within ten months. The $4,500,000 worth of structures on the parkway will be designed by George S. Richardson, consulting engineer of Pittsburgh, who has been employed as an associate of Mr. Baker.

This construction dream, which has been in the embryo stage for the past twenty years, will extend from Wilkinsburg to Grant St. in Pittsburgh, a distance of 9.1 miles, and will be composed of four- and six-lane roadways throughout. When completed, it will be the largest project ever undertaken by the Commonwealth of Pennsylvania as a single operation. Traffic studies, preliminary engineering and reconnaissance surveys have been completed by the Pennsylvania Department of Highways, so that the work to be done by the consultant will be confined to getting out actual job blueprints and specifications, ready for construction bids.

"This contract marks the first active progress in the tremendous postwar program planned by the Martin administration," Mr. Shroyer said, "and when the war ends and construction is actually started, it will not only permit immediate employment, but will remove one of the traffic bottlenecks in Pittsburgh."

Mr. Baker's organization has been engaged in the past two years in the furtherance of the war effort, as engineers and surveyors on numerous government contracts that would total, in construction value, to $700,000,000. He has surrounded himself with men who have been actively engaged for many years in projects of this type. The organization employs approximately 820 engineers throughout the United States and 14 foreign countries, maintaining offices in all sections of the United States.

• • •

Highway employe lack eased by Purdue students

Manpower shortage problems in the engineering department of the Indiana State Highway Commission are being solved in part by part-time employment of undergraduate students of Purdue University, according to S. C. Hadden, chairman of the commission. A total of 18 students, working in off hours during the day, spend an aggregate of 163 hours a week on preliminary road designing work for the highway department. This is almost the equivalent of four men working full time.

WPB lists clay pipe that can be manufactured

The War Production Board recently issued Limitation Order L-316 defining vitrified clay sewer pipe items that may now be manufactured. The order divides the country into three zones: Zone 1, all of the country east of the states of Washington and California, Zone 2 covers California south of the 36th parallel of latitude, and Zone 3 includes the state of Washington and all of California north of the 36th parallel.

Hereafter, all production of clay sewer pipe must conform to U. S. Specification SS-P-361a, with fittings and appurtenances in accordance with a prescribed schedule of sizes and types. In Zones 2 and 3 (Washington and California), the standards are slightly different than for the remainder of the country. U. S. Specification SS-P-361a covers both "standard" and "extra strength" pipe. Standard pipe, as specified, is practically identical with conventional double strength clay pipe.

Limitation Order L-316 was promulgated in the interest of the war effort to conserve manpower, reduce inventories of items for which there is but little war demand, and to standardize production in all plants so that hauls can be reduced to practical minimums. There is no restriction on the total quantity of pipe and fittings that may be produced.

It is still legal to produce items not on the prescribed list provided they are necessary for filling orders placed before Sept. 25, 1943, or are needed to make possible the sale of remainders of such items.

. W. Marshall, dies: uilt Penn Turnpike

muel W. Marshall, a member of the ulting engineering firm of Parsons, Brinckerhoff, Hogan & Macdonald, New York, died at his home in Norristown, Pa., on Nov. 25, aged 52. He had returned from Brazil two weeks earlier.

In 1937, Mr. Marshall, then chief engineer of the Pennsylvania Department Highways, was named chief engineer he Pennsylvania Turnpike Commis- to take charge of construction of the erhighway then projected across the ral part of the state. Upon comple- of that work he went into consulting ctice, becoming a member of the firm Parsons, Klapp, Brinckerhoff & Doug- in 1942.

or the past year he was in Brazil rep- enting his firm as resident manager chief engineer on the Rio Doce proj- near Rio de Janeiro. The work here olved reconstruction of the Victoria- naes R.R., development of iron mining rations at Itabiri and the construction ore loading facilities at Victoria.

Ir. Marshall was a graduate of the iversity of Pennsylvania and served rseas during the first World War.

• • •

Clifford Older dies, leading highway engineer

Clifford Older, 67, highway engineer, d Nov. 28 in Rochester, Minn. An anizer of the Illinois state highway partment, Mr. Older served as its chief gineer for many years. In 1924 he re- ned in protest over political demands t state highway employees contribute portion of their salaries to the gov- nor's campaign fund. Later he organ- d and became president of the firm of nsoer, Older & Quinlan, consulting en- eers, Chicago. He retired in 1932 to rk on the invention of highway im- ovements, chief among which was a el road expansion joint.

• • •

First steel rail is rolled in South America

Last week the Companhia Siderurgica lgo-Mineira, with appropriate cere- ony, inaugurated operations in their cently installed rail rolling mill, now unit of the large steel manufacturing ant at Monlevade, state of Minas Ge- is, Brazil. This is the first steel rail er produced in South America.

The entire plant and equipment for the rail mill was furnished by United States manufacturers and was assembled and shipped by Messrs. R. W. Hebard & Co., Inc., agents for the Belgo-Mineira Company in this country.

The new mill will produce 60 to 70 lb. standard rail and ultimate capacity will reach 40-50,000 tons per year. The Belgo-Mineira Company also produces plain and galvanized wire, plates and structural shapes and will shortly install a pipe mill.

Visitors to the Monlevade steel plant are greatly impressed by the model housing and hospital for its employees, surrounded by a thriving, prosperous community on a site which only a few years past was almost inaccessible jungle wilderness.

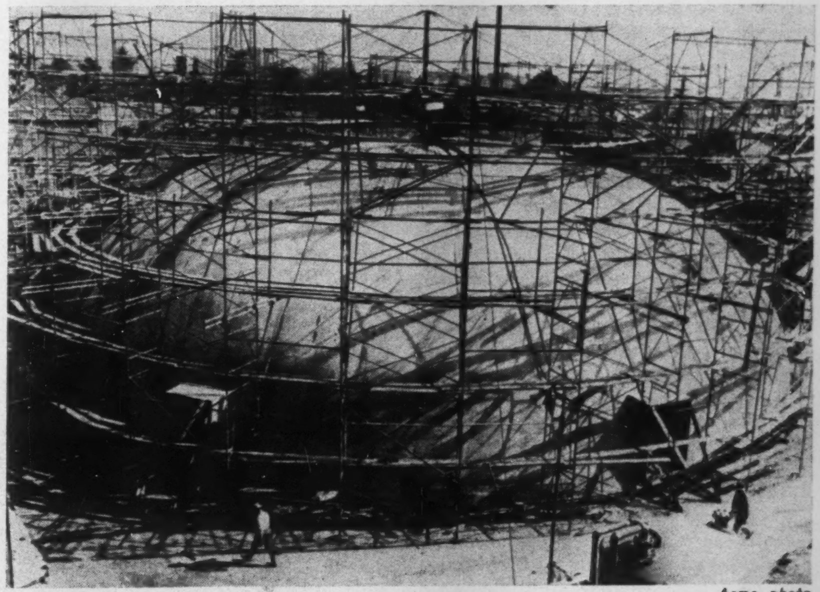
In addition to the plant at Monlevade, the Belgo-Mineira Co. owns and operates a large plant at Sabara where structural shapes and bars are manufactured. Both steel plants are located in the rich mining state of Minas Gerais, readily accessible to the greatest deposit of high grade iron ore in the world. Rail communications exist with Rio de Janeiro and Port of Victoria.

Consulting engineers on Portland postwar plan

Through an oversight the names of the consulting engineers who assisted Robert Moses in his report on postwar development for the city of Portland, Ore., were omitted from the summary of Mr. Moses' report published in *ENR* Nov. 18, p. 729.

The principal consulting engineering firms were Madigan-Hyland, W. Earle Andrews, Gilmore D. Clarke and Waddell & Hardesty, all of New York. Special consultants included J. J. Darcy and Henry A. Strecker of the New York State Department of Public Works; James F. Evans, New York State Department of Conservation; John C. Evans, Port of New York Authority; Arthur E. Howland and Sidney M. Shapiro, Long Island State Park Commission; George E. Spargo, New York City Department of Parks; and Harry Taylor, Triborough Bridge Authority.

The plan is now being considered by the Portland School Board, the City Council, the Port Commission, the Dock Commission, and the Multnomah County Board of Commissioners.



Acme photo

Inflated-bag forms let it down

With a crash that shook the surrounding neighborhood, this balloon-like concrete building being constructed at Eighth St. and Gladys Ave., Los Angeles, Calif., collapsed on Nov. 18. It was being built on canvas bag forms inflated with air. About 20 men working on the scaffolding escaped death or serious injury as the framework, although shaking violently, remained upright.

Officials of J. E. Haddock Co., Ltd., builders of the igloo-shaped building, were at a loss to account for the collapse. One advanced the theory that a loose piece of scaffold might have crashed through the mortar shell and pierced the canvas, allowing the air pressure to drop.

The huge canvas balloon was inflated by several air compressors to hold the shell intact until the mortar set. All the compressors were working at the time of the accident, it is said.

The first coat of mortar had been placed over the canvas and workers were preparing it for the second coat.

The mortar shell was 100 ft. in diameter at the base with a ceiling of 32 ft. at its apex.

Construction is to be resumed. The building is to be used as a sorting and marking room by a linen supply service.

Letter from LATIN AMERICA

By Edward J. Cleary

Managing Editor, Engineering News-Record

Chimbote, Peru—This sleepy fishing village on the barren, desert coast is in the midst of a metamorphosis, and one day Chimbote may be called the "Pittsburgh of Peru." Here, on one of the finest natural harbors on the west coast of South America, is to be located a coal, iron, and steel industrial center. To make this possible, financial credit has been advanced by the U. S. Export-Import Bank.

The Frederick Snare Corp. of New York already is engaged on the construction of port facilities, and coal mining operations have been started. Back in the hills not far from Chimbote work is advancing on the 125,000 hp. Canyon del Pato hydroelectric plant, which is expected to be ready in 1945 to supply cheap power for industrial purposes. On this project, Barton M. Jones, former head planning engineer of the TVA, is serving as engineer-director.

Sanitary engineers at work

And in the town of Chimbote, two North American sanitary engineers—Captain B. A. Whisler and Captain R. K. Horton, both of the Sanitary Corps, A. U. S.—are directing the activities that will make this a healthful place in which to live. They are installing works for the drainage of lagoons to eliminate malaria mosquito breeding, building a hospital and have just completed plans for the construction of water supply and sewage disposal facilities.

Before entering the Army, Captain Whisler taught sanitary engineering at Iowa State, did design work for Alvord, Burdick and Howson (with whom his Dad has long been associated), and most recently served as chief engineer for Shanley, Van Teylingen and Henningson, consulting engineers on the West Yellowstone winter training camp project. He was assigned to Peru in December, 1942.

Captain Horton was engaged on industrial waste research for the Textile Foundation and then completed postgraduate work at the University of North Carolina prior to accepting a commission in the Army. Horton arrived here in July, 1942.

Assigned by the Sanitary Corps to the Institute of Inter-American Affairs (which forms part of the Coordinator's Office), Captain Whisler and Horton were sent to Peru to direct engineering operations on a $1,350,000 cooperative health and sanitation program. The funds are supplied in large measure by the Institute, but the Peruvian government is also making a contribution, particularly in connection with the $500,000 project at Chimbote.

Water and food problems

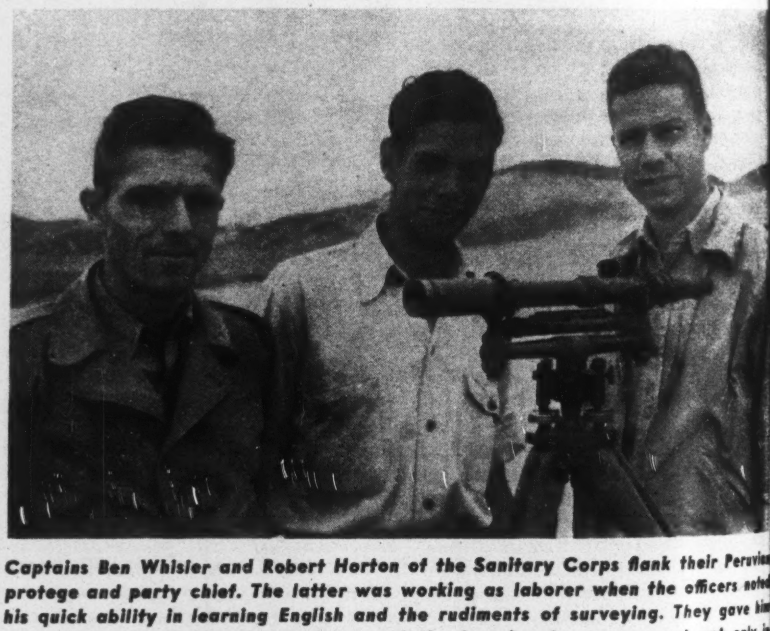
Completely absorbed with the challenging sanitation problems at Chimbote, both men are happily oblivious to the somewhat primitive and difficult conditions under which they must live and work. Their rented house—considered one of the best in town—is a crazy combination of rough boards, adobe walls and iron grilles; there are no plumbing facilities but they have rigged up an oil-drum tank and sprinkler head arrangement in the patio that serves as a shower bath. This, I would say, is their only luxury.

The local water supply—delivered in old oil tins via burro transportation—cannot be considered acceptable for quenching thirst; when your throat becomes too dry you suck oranges or drink hot tea if your personally chlorinated supply is not available. And to put away the food prepared in the town's "best" restaurant calls for—well, let's say, fortitude and some pretty strong digestive juices. But Whisler and Horton take it all in their stride. They are fully a justed, and talk of nothing else but finis ing the work on which they are engag so that they will be available for anoth assignment, preferably closer to comb activity.

Chimbote water supply, which will d appear when a new well and piping sy tem goes into operation.

Never once, in my three-day stay, d they utter a word of dissatisfaction complaint about living conditions. T fine morale and conscientious attentio to duty displayed by these two soldie engineers does honor to the uniform the wear and to the profession they serve.

There are more engineers like Whisl and Horton who are playing a part i creating better health and sanitary co ditions in lonely but vital outposts Latin America. I wish it were possib for me to see all of them and report their activities.



Captains Ben Whisler and Robert Horton of the Sanitary Corps flank their Peruvia protege and party chief. The latter was working as laborer when the officers note his quick ability in learning English and the rudiments of surveying. They gave him several months of intensive training and the boy has become expert not only in field practice but in computing traverses and level nets.

Colonel Hodges to retire as a Brigadier General

It has been learned through War Department channels that Col. John N. Hodges, Chief of the Construction Division, Services of Supply, U. S. Army Forces in the Middle East (USAFIME) is back in the United States, and that upon reaching the statutory retirement age of 60, February next, he will be advanced to the grade of Brigadier General on the retired list.

Colonel Hodges is probably the top Engineer officer in this war in respect to volume of overseas construction handled. According to the War Department, "Colonel Hodges ably supervised construction for U. S. Army activities in an area extending from Tunisia to the Indian Ocean and from the Levant to the Anglo-Egyptian Sudan. He solved many technical problems, and provided necessary equipment, materials and personnel for the prosecution of farflung construction operations in an industrially backward area. He successfully integrated the activities of large U. S. civilian construction forces upon termination of the contracts held by them. For his outstanding services as Chief of the Construction Division of USAFIME he was awarded the Legion of Merit."

It may be pointed out that not only did Colonel Hodges supervise all this work in the Middle East, but that as Division Engineer, North Atlantic Division, New York City, from April, 1940, to May, 1942, he organized and initiated it as well as awarded all of the original contracts.

Born in Baltimore, Feb. 13, 1884, and graduated from West Point in 1905, Colonel Hodges has devoted his lifetime to the Corps of Engineers. Prior to the last World War, he saw duty with troops at various military posts throughout the country as well as serving in the Philippines and in the District offices at Wheeling and Huntington, W. Va. Sailing for France, Dec. 4, 1917, he began a tour of duty that was continuously marked by brilliance and bravery in action. A major in rank in 1917, he returned from France in August, 1918, as a brigadier general (temporary).

In France he commanded a battalion of Engineers on construction work at Champlippe until Feb. 11, 1918 and then went to Doingt in command of the 6th Engineers where he had charge of construction of heavy bridges over the Somme. He took part in the Battle of the Somme, part of the time attached to the British Army. He was at the front at Chaulnes, Moreuil and at Demuin. He served at Abbeville and later at Camon where, with the Fourth British Army, he was in charge of construction of bridges and plank roads. Next he joined the Australian Corps at Forenfols in charge of more Somme bridge construction.

Advanced to the rank of brigadier general, he served in the dual capacity of commanding officer of the 6th Engineers and of the 3rd Engineer Division, and had charge of fortification work along the Marne until July 14, 1918. He was engaged in the Second Battle of the Marne, and then went to Fossoy in charge of foot and pontoon bridges preparatory to the advance of the 3rd Division across the Marne. For his World War services Colonel Hodges was awarded the American Distinguished Service Medal and the British Distinguished Service Cross, the citations reading "for gallantry in action" and "for exceptionally meritorious and distinguished services in a position of great responsibility . . . in the construction of heavy bridges on the Somme and on fortification and combat duty."

Brig. Gen. John N. Hodges (retired)

Reverting to his permanent rank of major upon his return to the United States, he was placed in charge of the First and Second Mississippi River Districts at Memphis, until May, 1923. As Eighth Corps Area Engineer he served from 1924 to 1927 at Fort Sam Houston. There followed a year at the Command and General Staff School at Leavenworth after which he was appointed chief of the construction section, Office of the Chief of Engineers in Washington, and in addition served as editor of the *Military Engineer*.

Colonel Hodges was District Engineer at New Orleans from 1931 to 1935, and Engineer of the Upper Mississippi Valley Division at St. Louis from then until 1938. Going to Hawaii as commanding officer of the 3rd Engineers and district engineer officer at Schofield Barracks, he returned in April, 1940, to begin a two year tour of duty as Division Engineer, North Atlantic Division in New York. In May, 1942, he was ordered to report to the Chief of the U. S. Military North African Mission in Cairo, Egypt. First appointed District Engineer of the North African Engineer District, he was later made Chief, Construction Division, S.O.S. USAFIME. Here, as chief engineer of the Middle East Theatre, in fact if not in title, he had charge of all of the vast Eritrean work, of depot and shop construction in Egypt and Palestine and of airfields in Northeast Africa and across Arabia to the Indian Ocean. Until his actual retirement in February, Colonel Hodges is on terminal leave on his ranch in Texas.

• • •

New CMP regulation helps maintenance work

The War Production Board has issued a new regulation known as Controlled Materials Plan Regulation No. 9A, to be administered by the Office of Civilian Requirements, under which contractors may obtain all shapes of copper, steel and aluminum for repairs and maintenance work. It replaces that section of Reg. 9 which covered wire only, and was applicable only for repair of electrical and radio appliances, and repair by electricians.

The new regulation does not embrace provisions for even minor extensions. All new utility and similar construction continues to come under Reg. L-41.

The new regulation does away with the necessity of filing form 4-B for copper wire, and permits purchase of this material merely by means of certification, and also permits purchase in like manner of amounts up to 20 tons of carbon and alloy steel, 500 lb. of copper and copper base alloy brass mill and foundry products, and 200 lb. of aluminum in specified forms and shapes, in any calendar quarter.

Contractors whose work is primarily of an industrial nature are authorized to buy 2,000 lb. of copper wire, and 2,000 lb. of copper and copper base alloy brass mill and foundry products. Such contractors can also apply by letter to WPB for authorization to use AA-2 preference ratings. Applications must show what kind of work the contractor is doing, and what kind of customers he has, and should be addressed to WPB, reference CMP Reg. 9A, Washington.

How dam projects are faring

Central Valley, Calif.—The United States Bureau of Reclamation has asked for bids on the construction of an additional 16½-mi. section of the Madera Canal, an element of the Central Valley Project. Bids will be opened on Dec. 10, in the Bureau of Reclamation office at Friant, Calif. This work will complete the canal.

Regional Director Charles E. Carey says: "The completion of the 16½-mi. section of the Madera Canal in the early part of 1945 will make water available for more than 25,000 acres of highly productive land. In the postwar period, complete installation of valves and gates at Friant Dam will permit delivery of irrigation water to the entire Madera Irrigation District."

Eight miles of the canal extending from Friant Dam are complete and work is in progress on an additional 11-mi. section which will extend the canal to the north bank of the Fresno River. Good progress is being made on the section now under construction, according to Construction Engineer R. B. Williams who is in charge of the work for the Bureau of Reclamation. "When that job was advertised we received 14 offers to do the work," Mr. Williams said. "Reports we receive indicate that there is a growing pool of idle construction machinery on the West Coast and we anticipate considerable interest on the part of the construction industry in the call for bids which has just been issued."

Some of the estimated quantities involved in the present call for bids include more than 900,000 cu.yd. of common and 8,000 cu.yd. of rock excavation, 5,880 cu.yd. of concrete placement in structures, installing 332,000 lb. of reinforcing bars, and 62,100 lb. of gates, gate hoists and other miscellaneous metal work. This section of the canal will be unlined, and the critical materials requirement has been reduced to the absolute minimum for bridges, turnouts, wasteways, and other structures.

Denison, Texas—Construction of a 138,000-volt transmission line from the $50,000,000 Denison Dam to the Texas Power & Light Company's substation near Sherman has been authorized by the Chief of Engineers at Washington.

Plans and specifications for the fifteen-mile line already have been completed and bids are expected to be invited soon by Denison District Army Engineers.

Materials for the new power line will be furnished by the government, and it is expected to be completed within sixty days after work gets under way.

Mexico—Work on Mexico's City new water supply is progressing satisfactorily and will be completed as scheduled in 1945 at a cost of $6,500,000. Federal health officials state that, with completion of the project, Mexico City's yearly water shortages should be eliminated.

The new reservoirs are being constructed in the Wolf gorge areas of Atarasquillo. Several dams have been built and nearly 10 mi. of tunneling through mountains is being done. The government is spending $100,000 a month on the project.

Bonneville—Bonneville Dam on the lower Columbia River will achieve its full potentialty of 518,000 kw. early in December with installation of the tenth and last generator, Lt. Col. Ralph A. Tudor, head of the Portland district, U. S. Engineers, has announced. Col. Tudor, under whose supervision the work will be done, said the final generator will be 54,000-kw. capacity, as were the last seven installed. The first two generators were of 42,200-kw. capacity.

Kentucky—Installation of four complete electric generators and parts of a fifth at the Kentucky Dam at Gilbertsville has been authorized by the War Production Board, George P. Jessup, manager of the project, said Nov. 17. The WPB acted to make possible almost capacity production of electric power at the dam when it is completed next summer, Jessup said.

Construction of the dam has been slowed because of a shortage of labor, Jessup asserted. The working force has been short about 1,000 men since the first of the year.

Columbia River—Complete agreement on the immediate Columbia River program appears near as several state and federal officials advocate an early start on three dams in this region, one each to be completed in 1944, 1945 and 1946.

If started at once, they will be completed in this order: Albeni Falls, on Pend Oreille River in Idaho, for storage only; Hungry Horse, on the south fork of Flathead River in Montana, for storage only; Umatilla Rapids, on lower Columbia River in Washington and Oregon, for both water power and navigation.

The newly proposed water level above Umatilla is 340 ft. which would necessitate some diking to prevent flooding around Pasco and Kennewick. The program was announced by Paul J. Raver, Bonneville power administrator, and army engineers and bureau of reclamation men concurred.

All dams must hereafter be built with multiple purposes in view, said B. E. Torpen, civilian engineer for the Portland office of the army engineers. This was seconded by Major R. W. Scheufele, executive officer for Colonel Ralph A. Tudor, Portland district engineer.

E. B. Debler of the Bureau of Reclamation Denver office, concurring in the immediate plan, also announced the present schedule for a series of dams in southern Idaho and for irrigation projects

U. S. Bureau of Reclamation photo

An internal form and reinforcing steel in place for a section of the monolithic siphon carrying the Madera Canal under the Fresno River. The siphon is 10.5 feet i.d. and its length, including transition sections, is 1025.5 feet.

re may lead to future rivalry between thern Idaho and central Washington prior construction.

l Azucar—The first test water was ned into the main canal of the El ucar Dam southwest of Reynosa, Tex., week of November 14. The El Azucar igation project will serve about 130,000 es in the surrounding area.

Missouri River—The Iowa state soil nservation committee has sent Iowa's ngressmen a 4-page statement of opposion to the plan of army engineers to ablish dams and reservoirs in the issouri river.

The committee said the proposed flood ntrol project would not attack the oblem at the source and advocated a ogram to insure maximum infiltration the source and restoration of marshes d creation of artificial lakes.

Yakima—Recent award of contracts r work on the Yakima Ridge Canal of e Bureau of Reclamation's Yakima irrition project in eastern Washington aves but ten miles of the 95-mile canal stem yet to be awarded.

The Murphy-Campbell Co., of Seattle s a contract for earthwork, a pipeline, terals, and for diversion channels for e Roza Division of the projects.

Bids on the remaining work are to be ken soon. Axel Osberg and C. H. Luderg of Seattle received the award for 11 iles between Mile 59 and 70, on their id of $447,034. The contract for 15 iles, between Mile 70 and 85, went to orthwestern Engineering Co., Inc., Raid City, S. D., on a bid of $252,306. ids were opened Oct. 12. The work ust be completed in 400 days.

Other awards went to Scheumann and ohnson of Seattle, Wash., which bid 127,845, for Schedule 1; and to Sather nd Sons of Spokane, Wash., which bid 235,266, for Schedule 2. Schedule 1 overs earthwork, concrete lining, and tructures for 8.2 miles of main canal, nd Schedule 2 relates to earthwork, conrete channel, and structures for a 3-mile asteway.

These firms were second lowest of eight idders on the two schedules. The low id of the Nat McDougall Company, Inc., f Portland, Ore.—$325,068.25 for the wo schedules—was rejected when the ompany added a stipulation that it be ermitted to pay higher rates of wages han those set forth in the specifications ithout being held in violation of any overnment regulations, which stipulation t later refused to withdraw.

The Bureau advised the company that his stipulation was not acceptable because the Wage Adjustment Board of he Labor Department has jurisdiction ver the approval for increasing wages.

JOBS OF THE WEEK

ROADS, Quebec

Department of Roads, Quebec, Que., awarded a contract to H. J. O'Connell, Ltd., Montreal, Que., for earthwork graveling on 13.9 mi. Highway No. 9, between Pointe du Chene and Papineauville. The estimated cost is $1,500,000. E. Gohier is the engineer.

WAREHOUSE, Indiana

International Harvester Co., Chicago, Ill., will construct a warehouse to cost about $1,000,000. The construction contract has been awarded to Indiana Engineering & Construction Co., Inc., Fort Wayne, Ind.

HOUSING, Galveston, Tex.

Robert E. McKee, El Paso, Tex., has been awarded a contract to build 37 family dwellings, community building, for Public Housing Authority, Fort Worth, Tex., at $714,800. H. Moore and J. E. Ward, Houston, Tex., are the architects.

HOUSING, Galveston, Tex.

Knutson Construction Co., Houston, Tex., has been awarded a contract by the Public Housing Authority, Fort Worth, for 500 family housing units to cost $1,127,000. R. R. Rapp and F. Stafford, Galveston, Tex., and D. Bartlelme Associates, Houston, Tex., are the architects.

HOSPITAL, Downey, Ill.

Veterans Administration, Washington, D. C., awarded a contract for additional buildings and utilities to Peter Hamlin Construction Co., Chicago, Ill., at $1,163,434.

DWELLINGS, San Diego, Calif.

Public Housing Authority, San Diego, Calif., received the lowest bid from Gorelnik Co., Los Angeles, on base bid one at $1,283,534; on base bid 3 from D. J. Daum, Inglewood, at $1,307,000. The work consists of 600 temporary dwelling units.

HOUSING, Cherry Point, N. C.

Bureau of Yards & Docks, Navy Department, Washington, D. C., awarded a contract for 500 units low cost housing at Marine Corps Air Station, to H. L. Coble, Greensboro, N. C., at $1,622,000.

HOSPITAL, San Leandro, Calif.

Monson Brothers, San Francisco, Calif., have been awarded a contract to build a hospital building at the Naval Hospital by the Bureau of Yards & Docks, Navy Dept., Washington, D. C., at $2,414,091.

HOUSING, San Diego, Calif.

William C. Crowell Co., Pasadena, Calif., will construct 300 temporary dwelling units for the Public Housing Authority and the City of San Diego at $779,900.

HOUSING, San Pablo, Calif.

Housing Authority of County of Contra Costa, Martinez, awarded contract for 400 family dwelling units to Moore & Roberts, San Francisco at $693,396. Keith Narbett, Eldridge T. Spencer and E. Geoffrey Bangs, San Francisco, are the architects.

RUNWAYS EXTENSIONS, Dallas, Tex.

U. S. Engineers, Denison, Tex., received the lowest bid for drainage and asphalt paving runways extensions from Texas Bitulithic Co., Dallas, at $910,000.

APARTMENT BUILDINGS, Middle River, Md.

Second Middle River Manor, Inc., Baltimore, Md., will construct 27 two-story apartment houses. The Maryland Construction Co. will erect. The estimated cost is $1,000,000. Alexander D. Crosett, New York, N. Y., is the engineer and architect.

APARTMENTS, Baltimore, Md.

Crescent Development Corp., Camden, N. J., will construct by separate contracts ten apartments at an estimated cost of $1,250,000. Barnett D. Singer, Jersey City, N. J., is the architect.

PLANT, New Jersey

Mahony Troast Construction Co., Passaic, N. J., has been awarded a contract for constructing a plant, for Wallington Tube Corp., Wallington, N. J. The estimated cost is $1,900,000. Defense Plant Corp. will finance.

Note—Additional bidding and contract news on many projects large and small appear in the Construction News section beginning on page 153.

OBITUARY

Morris Hans Knudsen, 80, Danish-born chairman of the board of Morrison-Knudsen Company, died in San Diego, Calif., Nov. 15.

Mr. Knudsen and Harry W. Morrison in 1912 formed a partnership which in ten years became a corporation, one of the Six Companies that built the Boulder Dam and San Francisco Bay bridges. Employees of Morrison-Knudsen were among civilian workmen captured on Wake Island. Recent projects of the company for the Army and Navy have included jobs at Midway and Alaska.

Harry C. Merritt, 62, former vice president and general manager of the Allis-Chalmers Milwaukee tractor division, who is said to have built that department from a $250,000 a year volume to $60,000,000 in 15 years, died at Littleton, Ill., on Nov. 17. Before his retirement several years ago, he was awarded the McCormick medal of the American Society of Agricultural Engineers. He joined Allis-Chalmers as a branch manager in 1923, was made manager of the tractor division in 1926.

W. J. Nauman, Jr., 50, died Nov. 16 at Whitehorse, Yukon Territory. He was employed as a civil engineer on the Alcan Highway, with headquarters at Whitehorse.

Prior to going to the Alcan Highway in late 1942, Nauman was employed by the engineering division of Kansas City, Kan., as coordinating engineer on the last stages of the Kansas City Terminal Market building project. Before that he was resident engineer inspector for the United States Government at Kansas City, and had supervised the early construction of the Market Terminal.

William Patrick Mitchell, 67, construction superintendent for Anglin-Norcross Corp., Ltd., who supervised the erection of such prominent Canadian landmarks as the Chateau Frontenac at Quebec, the Royal York Hotel and Canadian Bank of Commerce building at Toronto, and the Supreme Court building at Ottawa, died Nov. 17 at Montreal.

Frederick Arnold Kummer, 70, Baltimore engineer, novelist and playwright, died recently. He was graduated fro Rensselaer Polytechnic Institute with th degree of civil engineer in 1894, and f the next two years was assistant edit of the Railroad Gazette. In 1896 he wa named chief engineer for the America Wood Preserving Company and lat became general manager for the Easter Paving Block Company.

News of the Week
Continued on p. 101

CONTRACTS AND CAPITAL

CIVIL ENGINEERING construction volume in continental U. S. totals $52,181,000 for the week. This volume, not including the construction by military engineers abroad, American contracts outside the country, and shipbuilding, is 49 percent lower than in the corresponding 1942 week, but tops the $36,523,000 reported for the holiday-shortened preceding week.

Private construction exceeds its 1942 week's volume by 114 percent, but public work is 55 percent lower due to the 1 percent decrease in state and municipal construction and the 58 percent decline in federal work.

The current week's volume brings 1943 construction to $2,937,565,000, an average of $61,199,000 for each of the 48 weeks of the period. On the weekly average basis, 1943 volume is 67 percent below the $9,035,350,000 for the 49-week 1942 period. Private construction, $457,886,000, is 14 percent below a year ago, and public work, $2,479,679,000, is down 70 percent when adjusted for the difference in the number of weeks.

New capital for construction purposes for the week totals $1,248,000, and is made up entirely of state and municipal bond sales. The new construction financing volume for the 48 weeks of 194 $3,066,352,000, is 69 percent below th $10,207,263,000 reported for the 49-wee 1942 period.

CONTRACTS

Continental U. S Only
(Thousands of dollars)

	Week Ending Dec. 3 1942	Nov. 25 1943	Dec. 2 1943
Federal	$95,652	$33,637	$40,58
State & Municipal	3,853	1,592	3,81
Total public...	$99,505	$35,229	$44,39
Total private..	3,638	1,294	7,78
TOTAL	$103,143	$36,523	$52,18

Cumulative
1943......(48 weeks).......$2,937,56
1942......(49 weeks).......$9,035,35

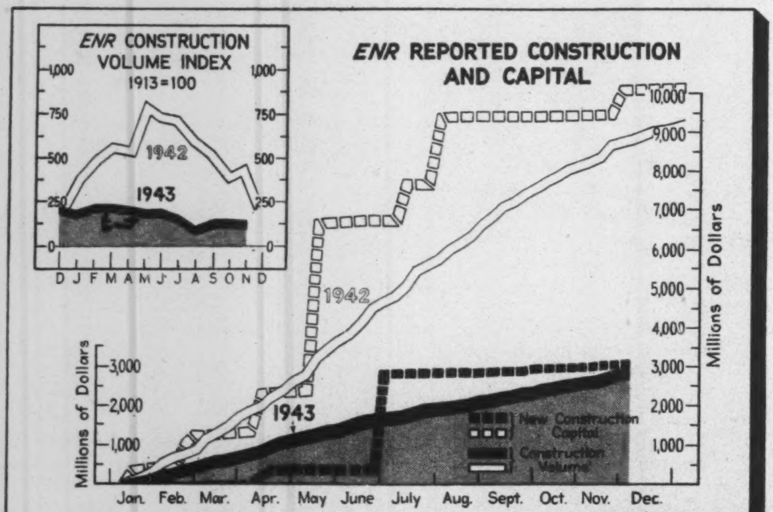
Note: Minimum size projects included are Waterworks and waterways projects, $15,000 other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

NEW PRODUCTIVE CAPITAL

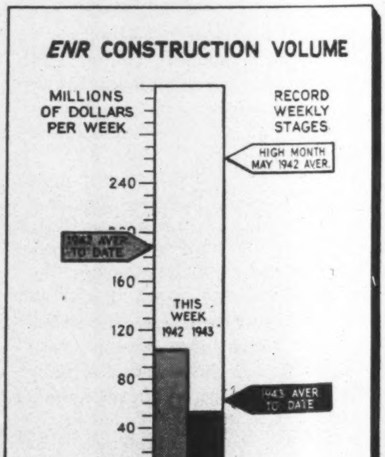
	Cumulative 1942 49 weeks	1943 48 week
NON-FEDERAL ..	$628,077	$312,51
Corp. Securities.	177,879	22,22
State & Mun...	210,043	124,60
R.F.C. loans	157,455	14,54
FPHA loans....	....	3,13
R.E.A. loans....	....	20,00
Fed.-Aid Hwy...	82,700	128,00
FEDERAL	$9,579,186	$2,753,83
TOTAL CAPITAL..	$10,207,263	$3,066,352

ENR INDEX NUMBERS

Index Base=100		1913	1926
Construction Cost..	Dec. '43	294.51	141.57
Building Cost......	Dec. '43	231.49	125.14
Volume	Nov. '43	149	65



ENR Business News



Comment and Discussion

Readers' opinions on matters that concern engineers and contractors

Back Issues Wanted

A committee to aid libraries in war-damaged areas in replacing lost or destroyed scientific publications has been set up by the American Library Association. The committee seeks the aid of professional men in this country in completing foreign institutional sets of American scientific and technical periodicals.

With an imminent paper shortage attempts are being made to collect old periodicals for pulp. Fearing this possible reduction in the already limited supply of scientific and technical journals, the committee urges all subscribers to engineering journals and members of scientific societies who must dispose of their files not to sell them for old paper without first getting in touch with the committee. Questions concerning the committee's interest in particular periodicals should be directed to Dorothy J. Comins, Study 251, Library of Congress Annex, Washington, D. C.

Year 'Round Construction

Sir: Post war plans for rehabilitation of service men and war workers fill every news outlet whether general or industrial. Each plan could be headed, appropriately—"Deliver us this day from W.P.A.", and yet no plan, including ours in the construction industry, has advanced an idea to cure the condition which brought about W.P.A., namely, lack of year 'round employment.

In the past, public works programs have been used as a panacea for the cure of unemployment, which, by the way, had not originated in the construction industry. Planners in the past have consistently overlooked the fact that during the winter months when the unemployed needed the relief the worst, we in the construction game calmly said, "You can't do our type of work in cold weather."

We thought we were getting away with something—we kidded ourselves that the government would make work for us in the spring, summer and fall, and in the winter time we could thumb our collective nose at the needy. *BUT*—the government created the W.P.A. (C.W.A. first) for relief of this condition, and the needy bureaucrats never released their winter grip on the situation. W.P.A. continued in clement and inclement weather alike.

Do we want to do the same thing over and over again? Or do we want to lend our support and influence to a law or an executive order that post war public works projects, whatever their size, be contracted on the basis that each project is one year's work; that contractors will include in their estimates, the cost of one calendar year's employment for the construction crew on that project; that some ratio, such as the man-hours-per-year to the total cost of the project, or some kindred formula, be used in determining the low and best bidder; that convicted chiselers on this scheme be prohibited from future bidding on similar projects.

In view of the recent experience in bidding with ethereal and sometimes balmy plans and specifications, I believe our industry would take these new estimating problems in their stride.

This thought is advanced not with the belief that it is a mature plan, but with the knowledge that a general discussion along these lines will produce results vastly superior to any conceived in the lone mind of the writer.

TROY CARMICHAEL
President
Standard Bitulithic Co.
New York

Lead Available for X-Ray Rooms

Sir: An article appears on p. 126 of the Oct. 21, 1943, issue of *Engineering News-Record,* which we believe gives a misleading impression about the use of lead for X-ray protection. The article states: "For a new research laboratory at Ohio State University, Columbus, Ohio, thick earth-filled concrete-block walls are used to shield operators of X-ray equipment and the public, instead of thick layers of lead used normally for such purposes. Because of the high frequency of the equipment, the lead lining of rooms housing the machines would have had to be 12 in. thick, which meant that several tons of that critical material would have been required."

Of course, the whole article is a description of a method that can be employed to save lead for X-ray work. While the statement made is undoubtedly true that lead is a critical material in the sense that it is necessary to the war effort, lead is *not* a critical material in the sense that supplies are inadequate, which is the meaning, I think, usually placed on the word "critical" by the public.

It might have been entirely impractical to use lead on this installation because it certainly would have been costly, which I imagine was the principal reason for not using it. Also, the project might have been planned in the early days of the war before the government had accumulated a large stockpile of lead. Nevertheless, I think, in view of the situation in lead now and the WPB's often repeated statement that lead is the most available of the metals, the wording used was unfortunate and will lead people to believe that they should not use lead for X-ray work.

The crux of the matter is that there are no restrictions whatsoever placed by the government on the use of lead for X-ray protection.

ROBERT L. ZIEGFELD,
Assistant Secretary,
Lead Industries Association,
New York, N. Y.

Chicago Subway Personnel

Sir: In your list of personnel responsible for the construction of Chicago's new subway, published with the article in your issue of Oct. 21, 1943, p. 598, my name was inadvertently omitted. From January, 1939 to October, 1940, the writer was construction engineer for all subway construction for the City of Chicago. During this time, the tunneling of tubes and roughing-in for stations was substantially completed. I left this work to accept a position as general manager for the contractors on the U. S. Fleet Base at Terminal Island, Long Beach, Calif.

A. M. CRAIN,
Chicago, Ill.

EDITORIALS

VOLUME 131 NUMBER 23

December 2, 1943

Farm Out the Work

HIGHWAY DEPARTMENTS throughout the country are not making the desired progress with plans and specifications for postwar work due to lack of engineers. Men have been lost to the armed forces or to war industries and cannot be replaced, chiefly due to limits set on compensation by civil service laws. Some cities have met this situation by farming out the work to private engineering firms. A similar plan is being recommended to the state highway departments by a joint committee set up recently by the American Association of State Highway Officials and the Associated General Contractors. This proposal has much merit. The over-all planning can be done by the engineering heads of the state highway departments; structural details for these plans, in large measure will follow state standards. The consultants could handle the detail work of adapting the broad planning to specific projects, being free to pay the higher rates to get men for that class of work. Also, the consultants would bring a fresh approach to many of the design problems that should be helpful if postwar planning is to step beyond the limitation of prewar thinking.

Student Aid for Road Plans

ONE WAY TO CIRCUMVENT the current shortage of manpower in the drafting office is to employ students in our engineering schools on a part-time basis, as at least one state highway department is doing. Employment of these potential engineers to plot field survey notes and perform other preliminary work incidental to highway design would permit the older and more experienced men to give more of their time to actual design problems, thus increasing the output of road plans and specifications. Advantages to the student would include the opportunity to earn additional money with which to continue his education and at the same time secure practical engineering experience not otherwise obtainable and which will prove invaluable in many instances after graduation. Many highway departments are committed to the reemployment after the war of men now in the armed forces, and thus will not want to fill their offices at this time with permanent employees. The hiring of part-time student engineers on a temporary basis would circumvent this situation and at the same time enable highway departments to complete more plans for road construction.

Progress in the Making

INDUSTRIES are wont to take well-trained structural engineers and develop them as specialists in a new field. Such men have designed soundproof structures in which to make "talkies", concrete ship hulls, ultra-streamlined aircraft and the fantastic steel towers, tanks and chambers in which petroleum derivatives are processed and refined. The design of some of the latter are particularly daring, as for example the 20,000-bbl. welded steel tank slung from a ring girder and supported in only one vertical plane, which is described in this issue. Although this tank is braced against wind and seismic forces from all angles, it is so delicately balanced that one man, by pressing against it periodically, can set it swinging slightly. Structural specialists, such as those responsible for this tank design, are constantly developing new fields, and these new fields make opportunities for other engineers. This is one of the meanings of the often loosely used term, "industrial progress", and it illustrates how civil engineers play an important role in giving the term vitality.

Achievement Rewarded

EVERYONE CONVERSANT with the career of Col. John N. Hodges will rejoice at the news that he is to be advanced to the rank of Brigadier General upon his retirement next February, at the age of sixty. It has seemed singularly unfair, although it was apparently no one's fault and only the result of ponderous War Department machinery, that he has not held this rank for the past two or three years. Immediately after Colonel Hodges left the position of Division Engineer, North Atlantic Division, this post was changed to rate a brigadier generalship. Then in the Middle East, perhaps because of his age, perhaps because of the S.O.S. setup there, he remained a colonel, although chief engineers of other theatres were brigadier generals. It was all the more unusual, because Colonel Hodges was a brigadier general in the last war, at the age of 34, probably the youngest B.G. in the Army. In the final analysis, however, it is not rank but achievement that counts, and Colonel Hodges' record is outstanding on that score. His World War accomplishments are well known, and in this war he has, to date, supervised more overseas construction, and nder more difficult conditions, than any other Engineer officer. Colonel Hodges deserves well of is country. May his years of retirement be many nd rich with satisfaction, as his years of service were numerous and filled with efficient and gallant activity.

Needless Duplication

THE PROPOSAL NOW BEFORE CONGRESS to set up a Rural Local Roads Administration within the Federal Works Agency, parallel to the Public Roads Administration (*ENR* Nov. 18, p. 727), should be rejected as needless duplication. The new agency would administer the allocation of federal aid to county road construction independent of the administration of federal aid to the state highway departments. This would mean that for every state there would be two federal agencies distributing federal money for road work and two sets of federal officers supervising the use of the money. Only as a means for creating more federal jobs and extending the possible influence of federal political patronage has the proposal any excuse. One of its worst features centers around the fact that most counties do not have the engineering force to direct the administration of federal funds in a manner that would be acceptable to the Federal Works Agency. To build up these forces would in itself use up a large part of available funds. Integration, not decentralization, of road planning, is what the future will demand. Strengthening of state highway departments, not dissipation of their leadership, is what is needed. Congress should turn thumbs down on a Rural Local Roads Administration.

U. S. in the Middle East

THE CURRENT CONFERENCES of U. S., British and Russian leaders and the recent articles in this journal on the construction activities of our Persian Gulf Service Command would seem to have little connection, yet it is quite probable that discussions of the implications of our activities in Iran were not overlooked in the talks. Certainly the conflict of Russian ambitions for ports on the Persian Gulf and British ambitions and established interests in Iranian oil must have been considered, because it is one of the burning problems of Allied postwar cooperation. And because the activities of our P.G.S.C. in getting supplies to Russia through Iran has so favorably impressed the Shah of that country, our future attitude toward the development of Iran is interesting to both Russia and Britain.

The U. S. position in the Middle East becomes more significant to our Allies when Saudi Arabia is considered, for here American oil companies have a half interest, with the local government, in what is believed to be the greatest undeveloped oil-field in the world. The presence of the two Arabian princes in this country recently, the appointment of a petroleum attache to our Middle East diplomatic group, and the interest Washington authorities are showing in fostering early American construction in Saudi Arabia, all tend to heighten concern over our Middle East intentions.

If, then, America is bracketed with Russia and Britain as having an interest in the Middle East, the conclusions of the Allied conferences should be studied with care by the American construction industry. Foreign construction looms as a promising postwar activity, and it is these military and political conferences that will create the atmosphere and make the rules under which it can be carried out in a friendly spirit of understanding among all of the Allied powers.

Bridge Inventories

IN ADDITION TO POSTWAR PLANS for super-highways, serious attention should be centered on the necessary replacement of many of our existing small bridges and drainage structures, which were in dangerously poor condition even before the war, and which have had little or no repair since. The proper approach to this problem is through a systematic inventory or bridge inspection program to determine just which structures are in the greatest need of repairs and which ones should be replaced.

Several state highway departments have secured data for such inventories through their statewide planning surveys, but other road-building agencies will have to start from scratch. Although methods of making small bridge surveys will of course be a matter of personal preference, basically the information that is needed relates to load-carrying capacity and widths. Not only will such data be of inestimable value in bridge-replacement work, they will also permit highway routes to be rated for truck loads, which have exhibited a steady rising tendency over the past few years. Bridge inventories are on the must list among postwar planning items of counties, states and cities.

ENGINEERING NEWS-RECORD WALDO G. BOWMAN, *Editor*

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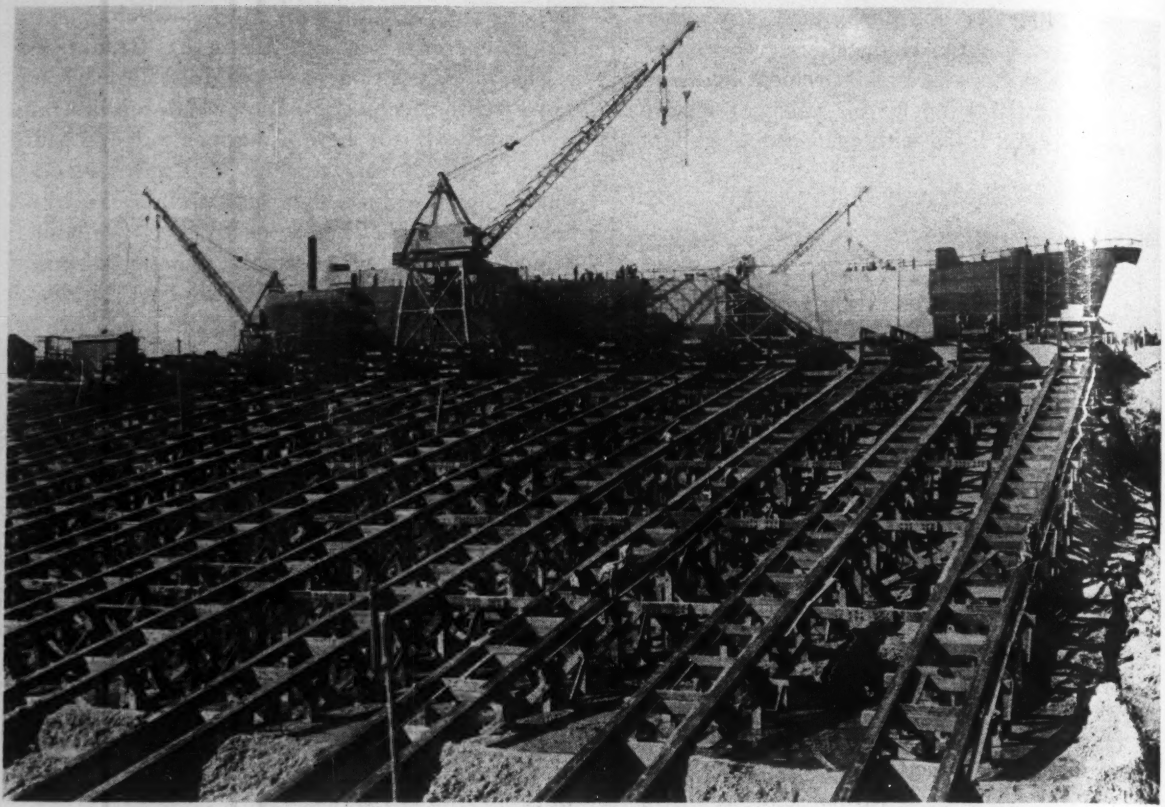


Fig. 1. Controlled ship-launching on timber ways sloping 1 on 4.75 is limited to 10 ft. per min.

Fast Shipbuilding at an Inland Yard

***Contents in Brief**—Shipbuilding attains a high rate of production at an inland yard built high above river level. Substantially constructed facilities and concrete paved building ways and transfer area insure the continued efficiency of the yard. The bow and stern sections of the ships are fabricated on the site, while other sections of the hulls are delivered prefabricated. Vessels are assembled on building ways, moved longitudinally on 26 dollies into a transfer area, from where they are transferred sidewise to launching ways that slope 1 on 4.75. Launching of ships is sidewise, under control at all times, and limited to travel of 10 ft. per min. All vessels are outfitted after they are water-borne.*

SHIPBUILDING by unique construction methods has proved, and is proving, highly successful at a shipyard on the banks of the Ohio River in southern Indiana, where five companies acting as joint venturers are assembling and outfitting tank-landing craft in steadily increasing numbers. At the inception of this shipbuilding program most of the supervising personnel, gathered from widely scattered parts of the country, were experienced builders of large bridges, power developments and other heavy construction, but were lacking in experience as shipbuilders.

However, by dint of hard work, aided by considerable Yankee ingenuity, production got under way in a minimum length of time, and increased as methods of assembly were improved and workmen were trained to their jobs. Preliminary surveys and preparation of plans for the shipyard were started in February, 1942, with grading of the site beginning the latter part of March. The first keel was laid June 25 and the first ship launched Oct. 30, 1942. These vessels are of all-welded construction with fillet welds ranging from $\frac{1}{8}$ to $\frac{9}{16}$ in.; the majority being $\frac{3}{16}$ in.

Of primary importance in selecting a site for the shipyard was the fact that it must be well above flood stage of the river. Since the building ways are 44 ft. above normal river pool, the launching ways were designed for controlled launching instead of free-launching of the ships. Normal free-launching would have required decreasing the inclination of the ways by such an amount that they would extend into the navigation channel of the river. Construction of a drydock, which would have required considerable time, was out of the question because speed of starting ship construction was of paramount impor-ice. Also, the cost of such installa-n would be excessive. Although site selected for the shipyard is ample size for present operations, will not permit much future expan-n of facilities. However, the area readily served by rail, trucks and er barges, and its proximity to a ge town helped solve the usual oblems of feeding and housing rkmen.

No fabricating shops are provided, ce the yard operates mainly as an embly plant, with the ship hulls ing suitably divided into sections ighing approximately 15 tons each prefabrication outside the yard, independent subcontractors. The ws and stern sections are, however, irely assembled in the yard.

The building ways and transfer ea cover a rectangular plot of ound measuring about 1,000 ft. rallel to the river bank, and 500 ft. de. In each end of this area there five building ways, while be-een them there is a large space that ves as a transfer area into which ips are moved from their building sitions and transferred toward the er bank to the launching ways. djacent to one end of the shipbuild-area are large sub-assembly skids ich serve as pre-assembly platens, on which the bow and stern sec-ns of the hull are fabricated.

Drainage of the site presented no ious problem due to the nature of subsoil and the appreciable height working area above the river level. ading of the site was confined iefly to leveling operations and the sting of some inferior topsoil and nsiderable debris from an aban-ned sawmill formerly located on site.

Shipbuilding area paved

Load tests made on the graded and mpacted subgrade for the building ys, transfer area and sub-assembly tforms indicated a safe soil bear-of 2,500 lb. per sq. ft. The entire ea of the building ways and transfer ea is paved with concrete. An 8-in. ick, double-reinforced slab is pro-ded for each building way, with a ft. wide strip being thickened to 18 under each dolly track. A 6-in. reinforced concrete slab covers the eas occupied by traveling gantrys, th a reinforced slab, 22 in. thick d 4 ft. 8 in. wide placed underneath slab at each gantry rail. The con-ete slab for the transfer area is of the same general details as for the building ways, and in addition, slab thickening is provided under each of the 13 dolly tracks that transfer the ship hull sidewise to the launching ways. Concrete was designed for a crushing strength of 2,500 psi. Unit working stresses of 1,000 psi. and 20,000 psi. were used for the concrete and reinforcing steel, respectively.

Sub-assembly skids on mud sills

Five sub-assembly skids are located between the extreme east end of the shipbuilding ways and the main storage area which is served by a railroad spur. This location permits a direct flow of materials from storage area to the building ways. Four of the sub-assembly skids, each measuring 72x100 ft. are used as pre-assembly platens upon which the bow and stern sections are fabricated. On the other skid, measuring 100x260 ft., sections of the hull are assembled for transfer to the building ways. All sub-assembly skids are supported on 10x10-in. timber mud sills spaced 4 ft. c. to c. and placed 18 in. below ground level. The mud sills support 10x10-in. by 2-ft. posts spaced 5 ft. c. to c. and capped by 10x10-in. timber beams which, in turn, support 55-lb. rails spaced 15 in. c. to c. that serve as the pre-assembly platen. Tops of rails are 2½ ft. above ground level. Mud sills are securely braced to top beams with 2x12-in. diagonal timbers to provide a stable working platform.

Uninterrupted assembly of the bow

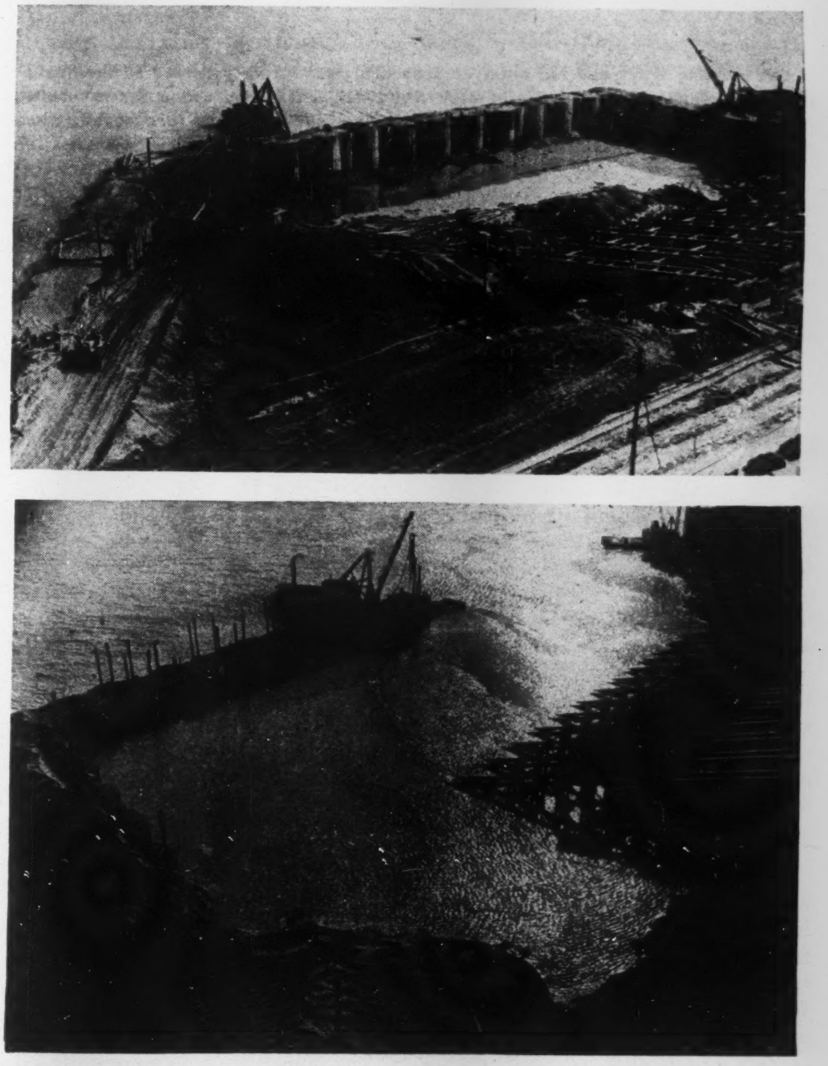


Fig. 2. Sand-filled cellular cofferdam of steel sheetpiling completely enclosing the launching-way area (at top) permitted construction of the outboard ends of the ways in the dry. The downstream wall was removed (at bottom) to permit waterborne vessels to be floated to the outfitting piers.

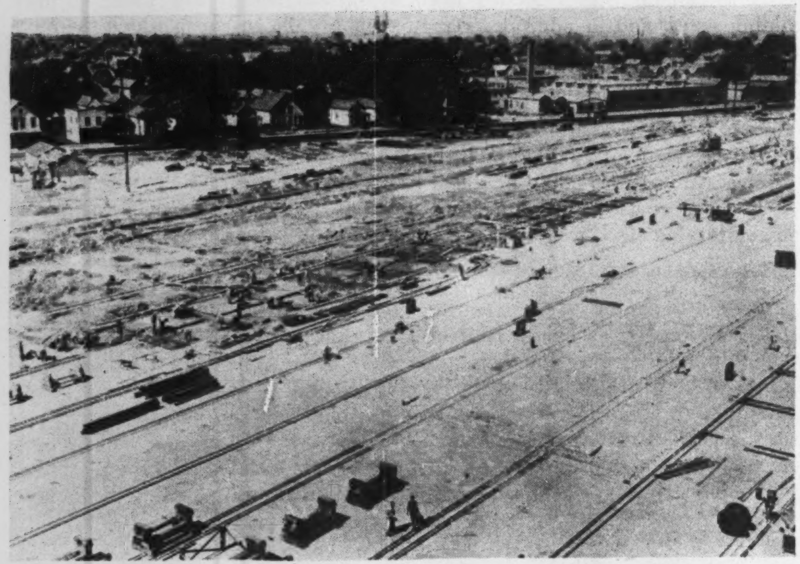


Fig. 3. Building ways and the transfer area are paved with concrete to facilitate ship construction during wet weather. Dolly car tracks and crane runway rails are anchored to the pavement. Timber shoring, shown in the foreground, was placed and the first keel laid before concreting was completed.

and stern sections is insured by providing mobile all-weather shelters to protect the workmen from inclement weather. These canvas covered shelters are of light timber construction, utilizing 6x6-in. posts spaced about 11 ft. apart and carrying timber roof trusses that span the width of the fabricated sections. The canvas roof covering is carried on 2x6-in. purlins spaced 24 in. c. to c. Rollers at the bottom of the posts operate on the platen rails to permit movement of the shelters completely off of the fabricating area so the completed bow or stern section can be picked up by traveling cranes. Both the bow and stern sections are assembled in an inverted position. Upon their completion they are picked up by three traveling cranes, operating simultaneously, and rotated into an upright position before being transported to the building ways.

Timber and concrete launching ways

In order to safely support the weight of the fabricated hulls, 13 launching ways are used, spaced 24 ft. c. to c. These 326-ft. long launching ways are built on a slope of 1 on 4.75. Two skids placed along the top of each way carry the launching cradles. Each skid is made up of two continuous 8x16-in. timbers standing on edge and bolted together with 1-in. bolts. At the extreme upper end of the launching ways two reinforced concrete bents support the skids, while at the outboard ends a box-shaped reinforced concrete retaining wall, 64 ft. long, carries the skids well below pool level. Intervening between the upper concrete bents and the lower retaining wall, are 27 timber pile bents supporting each pair of skids.

Each bent has three timber piles spaced 5 ft. c. to c. transversely and capped by a 14x16-in. timber. Pilecaps are drift-pinned to the tops of piles and the timber skids are securely anchored to pile caps with ¾-in. drift pins. Piles and caps are truly vertical, with the skids being dapped to fit the grade of the launching ways. The longitudinal spacings of bents vary from 4 ft. 10¾ in. c. to c., to 9 ft. 9⅜ in., depending upon the type of bent employed. Where sufficient penetration could be secured, the timber piles were driven to a bearing resistance of 20 tons, based on the *Engineering-News* formula. At other locations, 12x12-in. timber posts are supported on 2-ft. 3-in. thick unreinforced concrete foundations set in firm shale, well below ground line. The posts extend 3 in. into the foundations and they are bolted to 6x½-in. steel plates anchored in the concrete.

The launching ways were designed for a load of 5,000 lb. per ft. per skid and a lateral force of 10 percent of the vertical loads. Whenever the distance from ground line to bottom of pile cap exceeds 3½ ft., the piles in each bent are braced transversely and bents are braced in pairs with 4x12-in. timbers. Near the lower end of the launching ways, where the timber posts or piles project more than 10 ft. above the ground, double sets of sway bracing are used both transversely and between pairs of bents. Occasional batter piles driven on a slope of 3 on 1 and securely fastened to pile caps and skids add rigidity to the system of launching ways.

The 64-ft. length of box-type retaining wall at the outer end of the launching ways is of reinforced concrete with wall footings placed directly on undisturbed firm shale. Sidewalls supporting the timber skids are 7½ ft. c. to c. to match the spacing of the skids. Tops of walls are built on a 1 on 4.75 slope and the timber skids are anchored to the walls with 1¼-in. rods embedded in the concrete. A 20-in. bottom slab was poured monolithic with the side walls. Two 24x16-in. cutoff walls, placed below the slab and keyed into the shale foundation, prevent slippage of the retaining walls during launching operations. The outer end of retaining walls was carried down to 20 ft. below pool stage of the river to insure free floatage of the ships when launching during low water.

Cellular cofferdam of sheet piling

One especially interesting operation in building the launching ways was the construction of a sand-filled cellular cofferdam enclosing the launching-way area to permit dewatering of the site for construction of the outboard ends of the ways in the dry. This cofferdam also prevents river sand being washed into the launching pool, as well as protecting the ways from damage by drift and ice.

Each cell of the cofferdam contains 64 sections of 16-in. steel sheetpiling, 32 ft. long. Piling was driven to refusal in hard shale but since insufficient penetration was secured to prevent slippage, the cells had to be large enough so that when filled with sand, they would have sufficient weight to resist sliding and overturning from the hydrostatic pressure of the river on one side only. Consequently, 27-ft. dia. cells were used, spaced 31 ft. 1 in. c. to c. and joined with connector cells made up of 14 sections and four half-sections of sheetpiling. The four end sections of the connector cells were welded to main cells with ¼-in. continuous ts.

he cofferdam completely sur- nded three sides of the launching ys, utilizing 30 main cells over a tance of 930 ft., and 110 ft. of then dike with a steel sheetpiling e. Upon completion of the coffer- m, the area was dewatered by 4 trifugal pumps, construction of outer end of the launching ways s completed and the river bed, en- sed by the cofferdam, was graded a smooth surface with bucket ne and bulldozer. After completion the launching ways, the earth dike d eight of the cells forming the wnstream side of the cofferdam re removed to permit launched ves- s to be floated out of the launching ol and over to the outfitting docks.

Although the top of the cofferdam s placed 12 ft. above pool stage of river, flood water during the sum- r of 1942 threatened to overflow tops of the cells and interrupt con- uction of the launching ways. Dam- from the high water was averted driving a line of timber sheathing o the sand-filled cells along part of cofferdam and sandbagging other tions. Tops of sheathing were ced about 4 ft. above top of coffer- m and the river rose to within 0.4 of the design height before it sub- ded.

Launching cradles of welded steel

The 13 cradles used for sidewise nching of the vessels are of all- lded steel construction, sturdily de- gned to carry the heavy hulls as ey slide down the launching ways. ttom runners of 15-in., 33-lb. chan- ls, spaced 7 ft. 8 in. c. to c., rest di- ctly on the timber launching skids. ese channels are placed with their nges up and steel guide-plates, lded to the outside flanges prevent nsverse movement of the cradle. ertical posts of 8-in. 31-lb. steel ams support a 10-in. 33-lb. beam at e top, which in turn, carries timber ocking that supports the vessels dur- g launching. There are six sets of mber blocking on each cradle. Each t is made up of 3½x12-in. timber ates resting on the two top beams of e cradle. Two hardwood beveled edges rest on each timber plate and pport 12x12-in. cross-timbers, on p of which is a 12x¾-in. board that pports the hulls. Cross members of l-in., 36-lb. steel beams hold the ver- cal posts in position.

Transfer of the weight of the vessels from the dollies to the launching cradle was simplified by providing two pair of 18-in., 42.7-lb. channels between the vertical posts of the launching cradle. These channel beams, supporting an extension of the dolly runways on the transfer area, are supported at one end on a crossbeam at the front of the cradle, with the other end resting in a pocket formed at the top front edge of the machinery gallery. This enables the dollies to carry the ship out over the launching cradles where inverted jacks on the dollies, operating on jacking platforms on the cradles, lower the ship to bear on the timber blocking of the launching cradles.

Welded to the two front posts of the cradles are steel yokes supporting 42-in. horizontal sheaves to which are attached the launching cables. These cables extend from the cradle sheaves parallel along the bottom runners, over a pair of deflection sheaves mounted on the timber skids about 20 ft. from the upper end of the launching ways, thence horizontally to the launching machinery located in a machinery gallery. The top frame of the cradles and timber blocking for supporting the vessels are horizontal while the bottom runners are on a 1 on 4.75 slope to match the grade of the launching ways.

Storage space for incoming prefabricated hull sections is provided in several nearby areas. The sections are loaded onto truck and trailer lowboys by 50-ton truck cranes and transported to the shipbuilding ways. The plan of procedure in ship assembly involves the construction of the hulls on an even keel to permit the use of uniform heights of shores and blocking, thus simplifying this particular feature of construction. Erection procedure calls for the installation of prefabricated sections at approximate midships with work progressing from this point in both directions, fore and aft, in stepped fashion until the bow and stern sections are installed.

Cranes serve the ways

Crane service is furnished throughout the full length of the ten shipbuilding ways, including the transfer area, by nine Whirley cranes operating along six craneways and so arranged that three cranes serve each building way. Each crane is 35 ft. high to its fully-revolving platform on which is supported a 90-ft. boom having a 45-ton capacity at 30-ft. radius. All cranes are equipped with 100 hp. crane and hoist motors operating on a 440-v., 3-phase, 60-cycle current. Electrical power for operating each crane and hoist is furnished by a 500-ft. length of 3-conductor, 600-v., all-weather cable operating in a 4x6-in. groove in the concrete paved surface of the craneways. An outlet for each

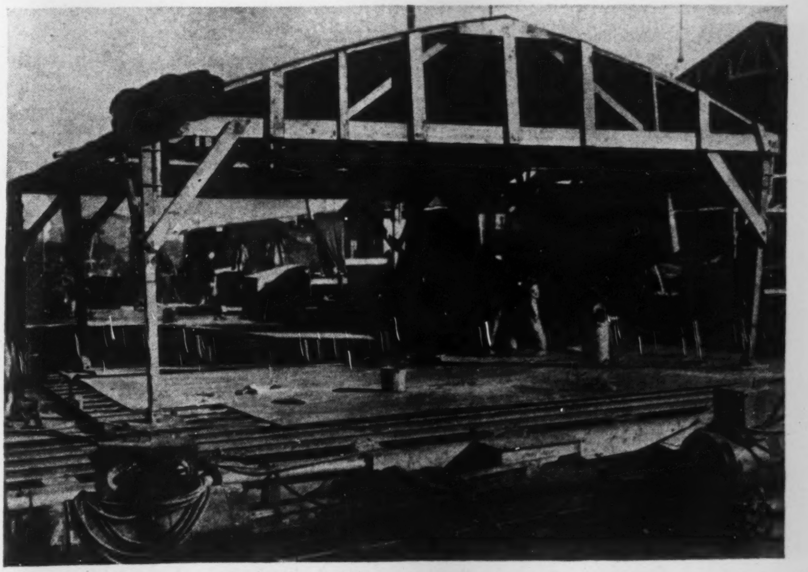


Fig. 4. All-weather protective shelters are of light construction for ease in handling. Usually operating on rollers along the platen rails, this shelter is shown supported directly on a large plate being fabricated.

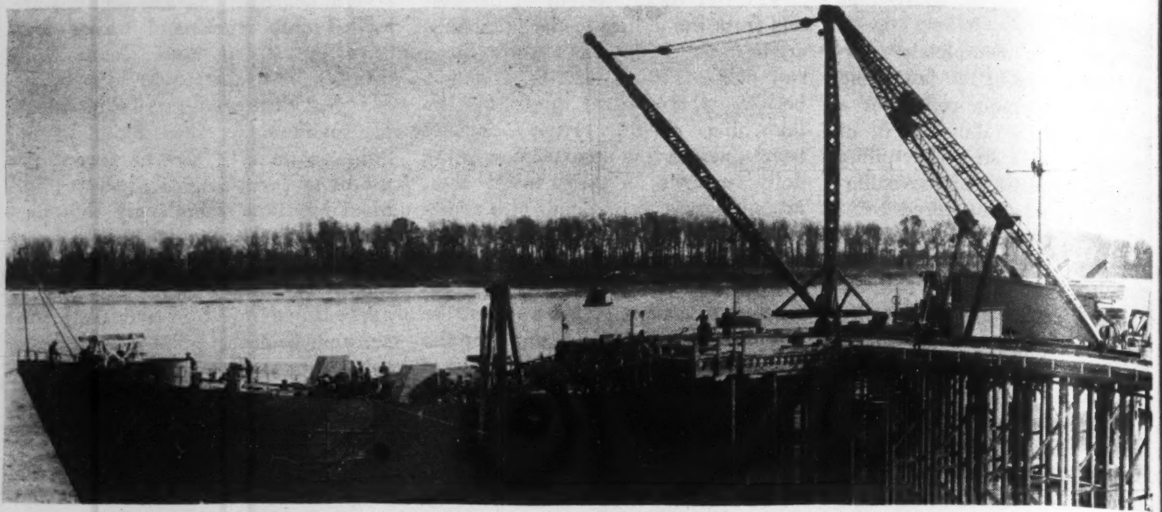


Fig. 5. Outfitting piers of timber decking supported on steel H-beam piles are connected to the shore by 20-ft. roadway ramps carried on timber piling. An electrically operated hoist powers the stiff-leg derrick on this pier.

cable is located midway of the run of the crane and a cable reel, equipped with a torque motor and brake to give proper tension control, reels-in and pays-out the cable as the crane is operated. Supporting rails for the cranes are 100-lb. crane runway rails, anchored to the concrete paving and spaced 24 ft. apart.

Movement of the ships

The movement of a fabricated hull is accomplished by 26 dollies operating in steel channel tracks anchored to the concrete surface of the shipbuilding ways and transfer area. Upon completion of a ship, its weight is transferred to the dollies, which are arranged in two rows of 13 each. The shoring is removed and a haulage winch moves the vessel into the transfer area. Inverted hydraulic jacks at the four corners of each dolly, are extended to lift the upper frame of the dolly sufficiently to permit a 90-deg. rotation of the dolly truck whereupon the jacks are retracted and the vessel is moved by a haulage winch transversely to the launching ways.

Upon arrival at the launching ways, the ship is raised slightly by the jacks and blocking is inserted between the top of launching cradles and the underside of the hull. A total of 13 steel, wedge-shaped launching cradles support the ship during launching operations. The jacks are again retracted and the dollies removed, preparatory to launching the ship which is then slid down the timber launching skids under control at all times and at a speed not greater than 10 ft. per min. The rate of launching is controlled by 13 cables operating on an equal number of winches located below ground in a machinery gallery.

This machinery gallery is of reinforced concrete extending along the full width of the launching ways. An inside clear width of 13 ft. is maintained, while the height varies from 8 to 14 ft., to accommodate the launching machinery. The top of the gallery roof is level with the concrete slab of the shipbuilding ways. The top slab is normally 12 in. thick and thickened to 30 in. at each dolly track. A 24-in. thick sidewall, adjacent to the earth fill, resists the live load surcharge caused by the loaded dollies. On the river side of the gallery a 12-in. wall is thickened to 24 in. under each launching skid to carry, by column action, the superimposed dolly loads. A 4-in. bottom slab throughout the gallery rests on nominal sidewall footings 2 ft. thick and 4 ft. 4 in. wide. Footings rest on firm undisturbed soil and they are stepped up as the height of gallery decreases.

Controlled ship-launching

Launching of the ships is controlled by two synchronized electric motors operating a 4-in. steel shaft extending the full width of the launching ways. Mounted on the shaft at each launching skid is a hoist sprocket capable of producing 3,456 in. lb. of torque. Prestressed steel cables used for retarding the movement of the ship as it slides down the skids are checked after each 10-ft. movement of the ship to prevent their being overstressed. The lengths of the cables vary from 770 to 915 ft.

Original plans for the shipyard contemplated that all machinery installation and other fitting-out would be done prior to launching. However, due to delays in obtaining machinery it was found necessary to complete fitting-out operations after the vessels are water-borne. For this purpose, four outfitting piers were constructed a short ways downstream from the launching pool with provisions made to outfit two ships at a time at each pier. Each pier is serviced by a stiff-leg derrick for installing machinery in the vessels; three derricks being equipped with 10-ton steam hoists and the other with a 40-ton electric hoist. A 50-ft. width, graveled service road along the bank of the river opposite the outfitting piers connects with the supply road that encloses the shipyard on three sides.

Piers supported on steel piles

Each pier is 45x90 ft., supported on 66 steel piles spaced 9 ft. apart each way, and driven to a 40-ton resistance. Piles are 10-in. H-beams, 60 ft. long and weighing 42 lb. per ft. Each row of piling is braced, parallel to the long dimension of the pier, with two horizontal continuous lines of 10-in., channels located at the mid-height of piling. Additional horizontal and diagonal bracing of 8-in., channels are located in the two end bays at each end of the dock. Transversely, the steel columns are braced at their mid-height with one horizontal line of 4-in., H-beams. All bracing was welded to piling with $\frac{3}{8}$-in. continuous fillet welds. Longitudinal pile caps of 14x14-in. timbers, supported on 12x1x9-in. steel plates welded to the tops of the piling, carry the timber decking of the outfitting pier. Tops of piers are about 36 ft. above pool stage of the river.

Connecting the outfitting piers to the shore are timber ramps about 100 ft. long. Securely braced timber piling, spaced 9 ft. c. to c. each way, and driven to a 20-ton bearing carry the timber decking that provides a 20-ft. roadway for the ramps. All connections between piling and bracing are bolted to permit maximum salvage.

Shipyard utilities

Provisions are made for two power and two lighting outlets on each side of each ship being assembled. Master control switches permit all lights to be cut off should an emergency arise, while at the same time keeping the power on. In addition, each building and each floodlight has a separate control switch.

Water is supplied under a 45-lb. head from the city mains through two systems of 8-in. pipe with intersecting connections so arranged that the water supply in either system can be shut off without impairing the supply to the shipyard. Iced water barrels throughout the area together with electric coolers at the outfitting piers and in the administration buildings add materially to the morale and efficiency of the workmen.

Acetylene gas is generated on the site by a battery of two 300-lb. generators and piped throughout the yard in $2\frac{1}{2}$-in. pipe, with the size of pipe being reduced to $1\frac{1}{2}$ in. at the outlets. Oxygen gas is purchased from a local commercial company delivered to the shipyard in steel cylinders by a fleet of three trucks, each carrying 22 cylinders that produce a total of 33,000 cu. ft. of free oxygen. Compressed air is piped throughout the area in 6-in. mains, with proper reductions being made at the outlets.

Air, oxygen and acetylene are piped from permanent yard outlets to the top of each hull as it is being assembled where manifolds are tack welded to the sides of the vessels.

Skeleton steel-frame construction is used in the shops building and the mold loft building. In these two-story buildings steel columns support steel floor beams and steel roof trusses which are covered with timber sheathing and a 90-lb. mineralized roofing. The ground floors of both buildings are concrete placed directly on a compacted soil, while the second floors are of timber. The shops building includes a riggers loft, pipe shop, electric and machine shop. The first floor of the mold loft is used as a warehouse. Fireproof construction of steel frames, covered with corrugated iron sheathing is used in the smaller buildings such as the acetylene building, paint shop and oxygen building.

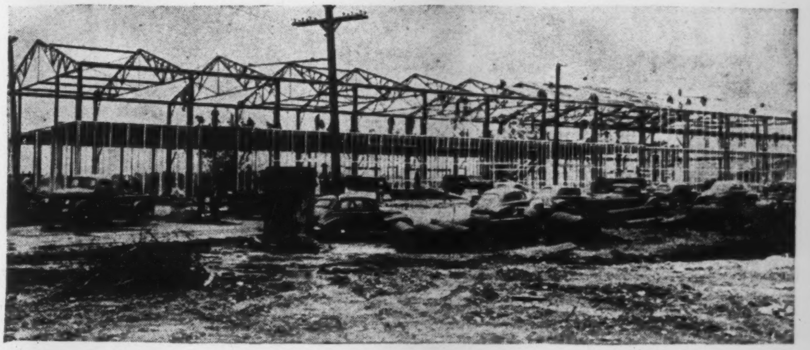
Employee training program

Much of the increase in the rate of production of the shipyard is due to the company-operated program for training employees. Conducted by 52 instructors, this on-the-site training program materially increased the efficiency of hundreds of workmen, enabling them to be up-graded to better jobs. Courses in welding and burning are taught on an around-the-clock schedule, with students receiving part-time pay while in training. Welders are trained in about seven weeks, while burners usually are taught in four weeks. Training for less essential jobs relating to shipbuilding is conducted on the student's own time, usually after working hours. Approximately 15 percent of the shipbuilding employees are women.

The five companies acting as joint venturers in this shipbuilding program are: The Missouri Valley Bridge and Iron Co., Leavenworth, Kans.; Bechtel-McCone-Parsons Corp., Los Angeles; Sollitt Construction Co., South Bend, Ind.; Winston Bros. Co., and C. F. Haglin and Sons, both of Minneapolis, Minn.

Included among those in direct charge of construction operations are: Frank Harrison, general manager; C. S. Jones, chief engineer; J. M. Lavin, administrative manager; John Kuhn, production manager; H. E. Lannan, general manager of outfitting; T. R. Davis, general superintendent of hull construction and Geo. Martin, chief inspector. Construction of the shipyard was under the supervision of Paul Gailbraith, superintendent of construction. Jack Rogers was chief field engineer and Lee Miller project engineer.

The Navy is represented by Lieut. Comm. F. G. Healy, USNR, supervisor of shipbuilding and Lieut. C. A. Shapiro, assistant supervisor of shipbuilding, and staff.



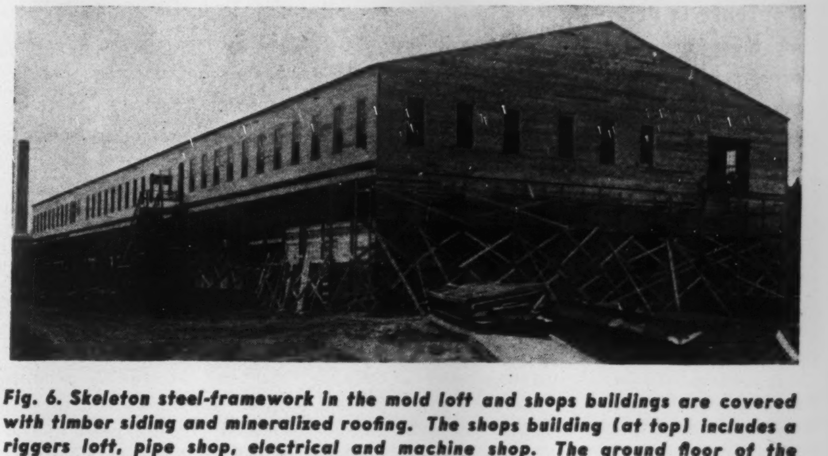


Fig. 6. Skeleton steel-framework in the mold loft and shops buildings are covered with timber siding and mineralized roofing. The shops building (at top) includes a riggers loft, pipe shop, electrical and machine shop. The ground floor of the mold loft building (at bottom) serves as a warehouse.

Fast Erection System for Big Rotary Kilns

J. M. Houck

Construction Superintendent, Aluminum Company of America

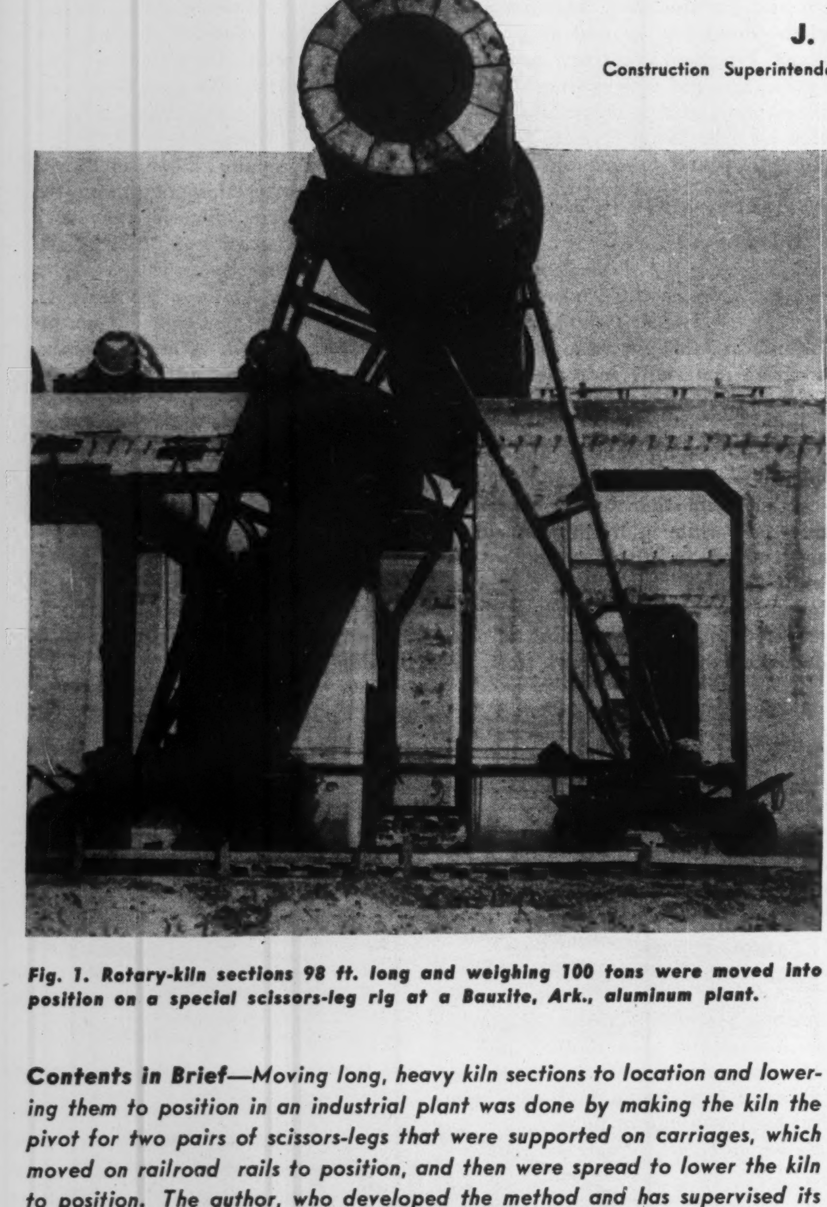


Fig. 1. Rotary-kiln sections 98 ft. long and weighing 100 tons were moved into position on a special scissors-leg rig at a Bauxite, Ark., aluminum plant.

Contents in Brief*—Moving long, heavy kiln sections to location and lowering them to position in an industrial plant was done by making the kiln the pivot for two pairs of scissors-legs that were supported on carriages, which moved on railroad rails to position, and then were spread to lower the kiln to position. The author, who developed the method and has supervised its use, describes the equipment and details of erection.*

FACED WITH THE TASK of setting many large sections of rotary kilns, erection forces of the Aluminum Company of America devised an unusual scissors-leg support and carriage to move and place the 98-ft. long, 100-ton sections of kiln. A system of erection was developed that provided for lateral movement of each kiln across concrete supporting piers and at the same time provides a simple means of lowering the shell into final position on the roller seat when the correct location has been reached. The scheme also provided for longitudinal movement of the heavy kiln, after it is lined up with adjacent sections for welding. And all of this is accomplished without the stacks of cribbing and complicated rigging used in the method of rolling kilns to position, and without the heavy cranes, requiring special track, that have sometimes been used.

Kilns used at some of the new Aluminum Company plants are 250 ft. long and 9-ft. 6-in. dia. of ⅞-in. thick plate. They are shipped from the fabricating shops in three completely assembled sections and the three sections are erected separately, then welded together.

In working position the kilns lie on a slope of ½ in. per ft. and are supported at four points by cast-steel riding rings of 12-ft. 6-in. outside diameter. These hold the kiln as it rotates, riding on cast-steel rollers mounted on a welded steel base, which is set on a concrete pier. The piers are set at high level so that the white hot effluent, aluminum oxide, may flow by gravity to cooling elements below. Pier heights vary from 17 to 25 ft. above the ground, to match the kiln slope. Usual construction practice is to complete the piers and install the support rollers before setting any of the kilns. The four rows of concrete supports, stretching 200 to 300 ft., depending on the number of kilns in a battery, thus present a formidable obstacle to the movement of bulky 100-ton loads.

Special moving support

The basic parts of the device used for moving the kiln sections are two sets of "scissors-legs" that support the ends of the kiln section and terminate at ground level in flanged-wheel trucks. These move on railroad rails laid at right angles to the kiln center lines.

The function of this mechanism can be understood best by comparing it to a triangle, one side of which is the base, and the other two sides, of equal length, represent the two legs of the scissors assembly. As the base of such a triangle is shortened, the upper pivot point will raise. Conversely, it will lower if the base length is increased.

In the actual mechanism the kiln shell is the upper pivot point of the riangle and the two bottom corners re the lower ends of the scissors-egs. The bottom corners rest on the rucks and the distance between them an be varied as required by a system f sheaves and wire rope. Power is upplied by a single drum hoist urned by a reversible air-motor hrough a self-locking, worm-gear peed reducer.

Articulation at the two bottom orners of the triangle is obtained by erminating the bottom ends of the cissors-legs with cast-steel balls, Fig. 2, which rest in sockets on the movble trucks. Articulation at the uper end of the scissors-legs, where the iln rests and the assembly pivots, is btained by terminating the upper nd of the legs in cradles or chucks hat fit the outside of the kiln shell nd permit rotation with the shell as he center.

One scissors-leg has two cradles, paced 6 ft. apart, and the other leg as a single cradle, which is placed nidway between the two cradles of he opposite leg. The face of the ingle cradle is greased and slides round the shell as the latter is raised r lowered. A two-leg assembly consisting of a single-cradle and a doule-cradle is used for support at each nd of the section of kiln being noved. The upper ends of the scisors-legs are not joined in any way ut maintain their alignment because he round kiln acts as a trunnion.

The scissors-legs are fabricated rom standard weight 6-in. dia. steel ipes which have the ends trimmed so that they may be welded together into a 6-in. circle to which a steel ball is welded to form the bottom. The cradle ends of the scissors-legs are cut on a miter and welded to one flange of a 12-in. beam that has a wood cradle bolted to the opposite side.

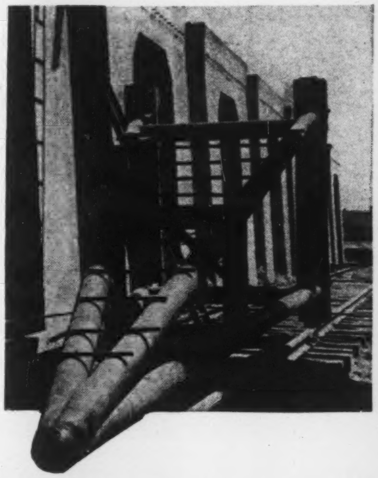


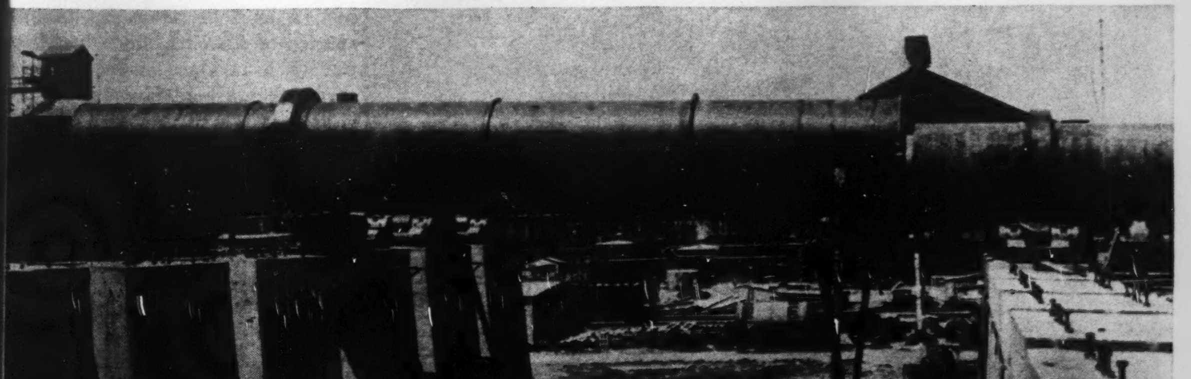
Fig. 2. Two-cradle scissors-leg of welded pipe. The pipe ends are welded to a steel ball that forms part of the supporting ball-and-socket joint.

Cross tying or bracing between the carriages and the tops of the opposite scissors-legs is not possible because of the high piers. Consequently, spread of one of the scissors-legs assemblies to 6 ft. between the cradles is an important part of the moving device, as longitudinal stability of the structure depends on this and the beam stiffness of the kiln shell. There is, however, sufficient flexibility in the moving device to permit an endwise movement of 6 in. either side of neutral position, thus making it possible to pull the ends of adjacent kiln sections together in preparation for welding.

Each scissors-leg assembly has equal length pipe members, a 2-in. shim being placed under the "uphill" cradle of the two cradle unit to allow for the ½-in. per ft. slope of the kiln. This keeps the assembly in a vertical plane and reduces the tendency to tip endwise that otherwise would occur.

Because of the slope of the kiln and the fact that supporting tracks are all at ground level, it is necessary that sets of scissors-legs be provided for use at each end and each joint of the kiln. Adjustable legs might have been provided, but less work was involved in making separate sets than in devices for adjusting their length for the unusually heavy loads to be carried.

Each kiln is raised to near its final elevation by means other than the scissors-legs as the angle at which it would be necessary to start the lift makes the power required almost infinite. Two satisfactory methods have been used for lifting the kiln from the delivery cars. That first used was a track elevated on an inclined dirt ramp, built with removable track sections and gaps for passage of the cross travel tracks for the moving carriages.



ig. 3. Upper end section of one of the large kilns being moved into position by a winch mounted on a crawler tractor.

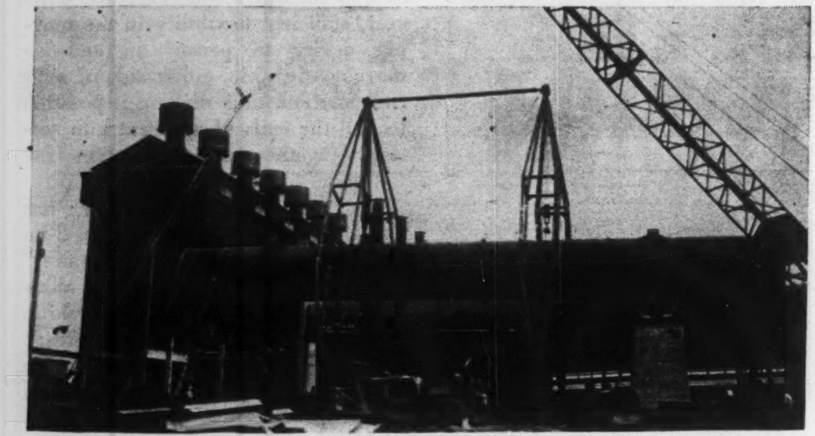


Fig. 4. Hoisting rig of four stiff-legs mounted on two converted box-cars raise a 100-ton kiln section for attachment of scissors-leg supports. Flat cars would have been used for this service if they had been available.

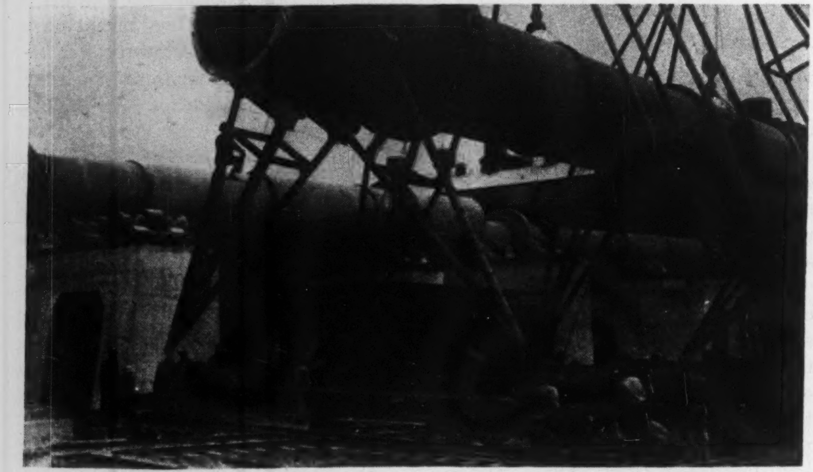


Fig. 5. Double and single scissors-legs being attached by cables to the kiln. The space between the cross-travel trucks was varied to adjust the height of the supported kiln, being increased to lower the kiln to position.

A revised method of elevating the shell uses a double A-frame lifting rig set on two railroad cars for mobility. Each of the A-frames is a pair of stiff-legs made of 6-in. standard weight pipe, Fig. 4. These are mounted on modified box cars, the ends of which were moved in to provide room for a steel shrouded wood base directly over the car trucks. The cars are located on tracks 50 ft. apart and a 55-ft. high stiff-leg, mounted at each end of each car, is leaned over to contact the stiff-leg from the opposite car. The two stiff-legs are connected by a steel-shrouded wood cross-head to which the lifting tackle is attached. Lugs are provided on the bases of the stiff-legs for a wire rope connection between them to form the third member of a force triangle, thus avoiding side pressure on the cars when a load is lifted.

The tops of the two pairs of A-frames are spaced and held by an 8-in. standard steel pipe, pin connected at each end. The two pairs of frames are kept in an upright position by wire rope guys placed diagonally from each cross head to the opposite end of each car.

Operating procedure

Tracks for kiln delivery, for the A-frame cars and for the cross carriages are at the same level, the latter being at right angles to the other tracks. Rail junctions are slots in one rail-head with the cross rail held by splice plates welded at a right angle.

Actual operation of moving a kiln section is as follows: Cars bearing the kiln are spotted exactly opposite the point at which the piece is to rest, or 6 in. ahead if an adjoining section of the kiln is already in place. The cars carrying the A-frame are placed so that the load on the two sets of frames is approximately equal.

The kiln section is raised on the A-frames by hoists mounted on the cars and a small crawler or truck crane is used at each end of the kiln to attach the two scissors-legs. Transfer cars are brought to position and the kiln lowered so that the ball ends of the legs come in contact with the socket on the carriages. Cable connection between the two transfer cars at each end is then taken up so that the kiln load is raised slightly by the scissors-legs. This takes the load off the A-frame and the cars bearing them are moved longitudinally beyond the ends of the kiln. Carriages and the kiln are then pulled to the desired position by winch tractors and the load is lowered to the rollers by slacking the line holding the two carriages together.

Where it is necessary to move the kiln endwise after it reaches its lateral position it is done by a chain hoist, a pull of about 5 tons being required to rock the kiln 6 in. This endwise movement is necessary in placing all except the discharge end of the kiln. Kiln sections are supported on the scissors-legs until welding to the adjacent part is completed.

The number of men required in the erection crew is small in relation to the work accomplished. A crew of eight men has consistently set a kiln section in 4 hr. from the time it is spotted on flat cars under the A-frame until it is in place on the permanent supports and ready for welding. The section is placed during the day, the joint is welded at night and the equipment is ready for a repeat operation the next day.

The kiln handling rig is arranged so that it can be moved between different jobs by merely loading the scissors-legs, carriages and A-frames on cars and transferring them to new work, the supporting cars for the A-frame traveling on their own wheels as regular car units. This outfit has already been used at three places and has proven economical on each job.

Erection of the kilns is done by The Aluminum Company of America's own forces under direction of E. H. Beyhl, erection superintendent of The Traylor Engineering and Mfg. Co.

Live Load Reactions to Timber Stringers

J. E. Lothers

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Stillwater, Okla.

***ntents in Brief**—Current design specifications governing the distribution wheel loads to stringers of timber highway bridges carrying laminated ber flooring are questioned as being too conservative. Formulas are eloped for calculating this live load distribution, based on the relative fness of the load-carrying stringers and the superimposed timber flooring. ues of wheel-load reactions to stringers of various spacings, as computed the proposed formulas, are compared with those recommended by the A.S.H.O. specifications and other proposed methods.*

VIEW of the increasing popular- of the use of timber in highway dge construction, some revisions in American Association of State ghway Officials' 1941 edition of ndard Specifications for Highway dges that pertain to timber bridge ors would seem to be desirable. In rticular, some relaxation of the id requirements of Specification .14 to permit a more liberal dis- bution of the wheel load to adjacent ingers for horizontal shear compu- ions would seem to be justified.

This specification, as now written, rmits the placing of the wheel load the quarter-point of the span or ee times the stringer depth from support, whichever is the lesser tance, and allows a load equal to -half the sum of the wheel load and load used at midpoint for moment mputations. That is, $P_v = 0.5P_m$ $0.5W$ in which P_v and P_m are the cified portions of W, the wheel d, for shear and moment respec- ely. Shear invariably governs, and orbitantly large stringers often re- t from the use of this formula.

Clifford Johnson, bridge engineer, rth Dakota State Highway Depart- nt, mentions the formula, $P_v = P_m$ $0.1W$, in the January, 1943, issue *Wood Preserving News*, and W. D. eney, engineer, Service Bureau, erican Wood Preservers Associa- n, proposed the formula, $P_v =$ $P_m + 0.2W$, in the June, 1941 ue of the same magazine. In all ree of these formulas, the P_m is ken from the A.A.S.H.O. Specifica- n 3.3.1. In columns 6, 8, and 9 of accompanying table, values of P_v from these formulas are recorded for means of comparison with values from the writer's proposed Equation 4 in column 7.

Points in question

Specifically, the writer takes issue with the A.A.S.H.O. specifications on the following three points:

(1) The distribution of the wheel load for moment as specified in 3.3.1 seems to be too conservative for the longer stringer spans and on the side of weakness for the shorter ones. This may be verified by comparing values of P_m listed in columns 4 and 5 in the table.

(2) The distribution of wheel load to adjacent stringers permitted for shear at the quarter-point by Specification 3.4.14 seems to be unnecessarily rigid. In effect, the specification permits one-half as much distribution here as at the midpoint. The writer finds this proportion to be, on the average, slightly over three-fourths. The proportion varies, however, over a wide range, depending on the stringer-floor relations and should be based, therefore, on a formula which takes those relations into account.

(3) The chief objection to the tabular method of specifying load distribution to stringers is that it is

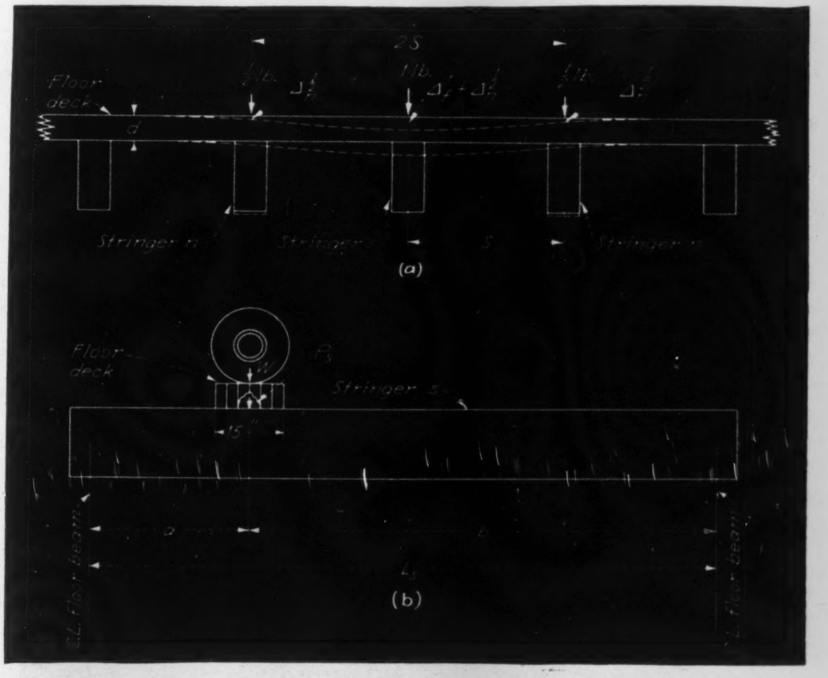


Fig. 1. In calculating the proportionate amount of wheel loads to any one stringer, the relative stiffness of adjacent stringers must be considered as well as the rigidity of the flooring, as indicated in (a) above. Wheel loads are distributed over a 15-in. width of flooring, as shown in (b), with the wheels being placed in the proper position for calculating shear and bending moment.

TABLE OF DESIGN LOADS FOR TIMBER STRINGERS

H-15 loading—One traffic lane—2x6-in. transverse laminated flooring

L_s	S	I_s	*P_m (For moment)		**P_s (For shear)				Relative Distribution ¼-point	
			AASHO	Eq. 3	AASHO	Eq. 4	Johnson	Keeney	AASHO	Eq. 4
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
8	2	697	4800	5660	8400	6540	6860	6930	0.50	0.86
9	2	697	4800	5240	8400	5970	6440	6590	0.50	0.89
10	2	697	4800	4940	8400	5540	6140	6350	0.50	0.91
11	2	697	4800	4730	8400	5210	5930	6185	0.50	0.93
12	2	697	4800	4580	8400	4970	5780	6065	0.50	0.95
8	3	1128	7200	8700	9600	9740	9900	9360	0.50	0.69
9	3	1128	7200	8000	9600	9130	9200	8800	0.50	0.72
10	3	1128	7200	7370	9600	8520	8570	8296	0.50	0.74
11	3	1128	7200	6830	9600	7950	8030	7864	0.50	0.78
12	3	1128	7200	6380	9600	7430	7580	7504	0.50	0.81
8	4	1707	9600	10700	10800	11200	11900	10960	0.50	0.62
9	4	1707	9600	10260	10800	10920	11460	10610	0.50	0.63
10	4	1707	9600	9790	10800	10580	10990	10230	0.50	0.64
11	4	1707	9600	9300	10800	10210	10500	9840	0.50	0.66
12	4	1707	9600	8820	10800	9840	10020	9455	0.50	0.68

*Column 4 was computed from specification 3.3.1; that is, P_m $WS/5$.

**For column6, $P_s = 0.5P_m + 0.5W$; for column 8, $P_s = P_m + 0.1W$; and for column 9, $P_s = 0.8P_m + 0.02W$.

not sufficiently elastic. Too many factors are involved. Obviously a short stringer, everything else being equal, will take a larger proportion of a concentrated load placed on the floor above it than a long one. The A.A.S.H.O. specifications do not differentiate between short and long spans as they pertain to wheel-load distribution. The only safe alternative is a tabular value that is wastefully conservative in the medium and long spans.

A formula which takes into account stringer-floor relations and which applies equally well to the design loads for moment and shear is proposed below. It takes the form,

$$P_{(stringer)} = W\frac{K_1x + K_2y}{K_1x + 3K_2y} \qquad (A)$$

in which the constants, K_1 and K_2, depend on the deflection coefficients used for the floor and stringer, and upon the point of application along the stringer to which the formula applies. The variables, x and y, consist of the spans, dimensions, etc., of the stringer and floor deck being investigated.

Stiffness of stringer defined

For the purpose of this discussion, let the stiffness of a beam at any point be defined as the reciprocal of its deflection at the point for a unit load placed over the point. Under this definition, the stiffness varies from point to point along the beam, being least at the midpoint.

A load placed on the floor over a stringer is carried partially by the stringer and partially by the floor, spanning between the two adjacent stringers with a span of 2S in which S is the stringer spacing. If all supports were rigid, the load would be distributed between the stringer and the floor in direct proportion to their stiffnesses at the point of intersection. That is,

$$\frac{P_s}{P_f} = \frac{1/\Delta^1_s}{1/\Delta^1_f} \qquad (B)$$

in which P_s and P_f are the portions of the load carried by the stringer and floor, respectively, while in like manner Δ^1_s and Δ^1_f represent relative deflections of the stringer and the floor. Or, if W be the total load $(P_s + P_f)$ then, remembering that the terms of any proportion are in proportion by addition or composition,

$$P_{(stringer)} = W\frac{1/\Delta^1_s}{1/\Delta^1_s + 1/\Delta^1_f} \qquad (C)$$

The distribution of the wheel load between the floor deck and the stringer is complicated, however, by the fact their supports are not rigid. Half the portion taken by the floor is carried to each of the adjacent stringers causing them to deflect along with the floor under the half-load.

Referring to Fig. 1a, and considering the floor deck as spanning between the adjacent stringers n, with stringer s removed; that is $L = 2S$ with a unit load at its midpoint, then one-half pound is transmitted to each of the stringers n causing a deflection in each of them equal to $\Delta^{\frac{1}{2}}_n$. The total deflection for the unit load of th 2S floor span, then, would include thi deflection of the stringers n. Thu the total unit deflection of the floor i $\Delta^1_f + \Delta^{\frac{1}{2}}_n = \Delta^1_f + \frac{1}{2}\Delta^1_s$, th Δ^1_f being computed for a span of 2S Accordingly, the relative stiffness o the floor as compared to that o stringer s is $1/(\Delta^1_f + \frac{1}{2}\Delta^1_s)$. I the actual case, then Equation C becomes

$$P_{(stringer)} = W\frac{1/\Delta^1_s}{1/\Delta^1_s + 1/(\Delta^1_f + \frac{1}{2}\Delta^1_s)} \qquad (D$$

in which $\Delta^1_s = a^2b^2/3EI_sL_s$ and Δ^1 $= (2S)^3/48EI_f = S^3/6EI_f$. If thes deflection values be substituted for Δ and the resulting equation simplified

$$P_{(stringer)} = W\frac{I_sL_sS^3 + a^2b^2I_f}{I_sL_sS^3 + 3a^2b^2I_f} \qquad (1$$

Both the floor and the stringers ar considered to be simply supporte and, of course, the small portion o the wheel load that gets to the mor remote stringers is neglected. As th floor beam deflects, the floor an stringers are lowered as a unit. It deflection, therefore, does not affec the problem except, perhaps, t slightly decrease the theoretical loa that gets to stringer s. Thus, the ef fects of all assumptions made in set ting up Equation 1 contribute towar a slight error on the conservative side

The A.A.S.H.O. Specification 3.3.5 sets the width of transverse, laminate flooring over which the wheel load i to be distributed at 15 in., as indi cated in Fig. 1b. Using the 15-in width and a depth d for the floor deck Equation 1 becomes:

$$P_s = W\frac{4I_sL_sS^3 + 5\,a^2b^2d^3}{4I_sL_sS^3 + 15\,a^2b^2d^3} \qquad (2$$

Equations 1 and 2 are applicabl for any position of the wheel loa along the stringer, a and b being th distances of the wheel from the lef and right supports respectively. Al stringer functions are indicated b the subscript s, and all symbols excep P and W are in inch-units. If $L/2$ b substituted for a and b in Equation 2 the value of P for moment at the mid point of the stringer is found to be

$$P_m = W\frac{64\,I_sS^3 + 5\,L_s^3d^3}{64\,I_sS^3 + 15\,L_s^3d^3} \qquad (3$$

In most cases, the quarter-point o the stringer will be closer to the sup port than three times the stringe depth. Assuming the quarter-point t be the critical section for horizonta shear and substituting $L/4$ and $3L/4$ for a and b, respectively, in Equation 2,

$$P_s = W\frac{1024\,I_sS^3 + 45\,L_sd^3}{1024\,I_sS^3 + 135\,L_sd^3} \qquad (4$$

The table has been compiled for e purpose of comparing the comted values from the proposed forula, over the usual range of stringer ans and spacings, with those found the A.A.S.H.O. specifications. It is lf-explanatory except for columns) and 11.

As mentioned above, the A.A.S. O. specification 3.4.14 allows onelf as much distribution to the adjant stringers at the quarter-point as permitted for moment at the midint. This is indicated in Column . Column 11 shows the correspondg relative distribution at the quar-point as computed by Formula 4. r example, 0.86 = (12,000–6,540) 12,000–5,660). The extremely high lues in column 11 corresponding to e 2-ft. stringer spacing are due to e excessive floor strength in the narw stringer spacing.

In order to get a true comparison between Formula 4 and the formulas of Johnson and Keeney, the P_m for the latter was computed by Formula 3. That is, P_m was taken from Column 5 for computing values for columns 8 and 9. Attention is called to the close check in the wider stringer spacings between values from the proposed formula in Column 7 and Mr. Johnson's formula in Column 8. It should be noted also that the proposed formula reflects the strong beam action of the floor with narrow stringer spacing. This is illustrated by the disparity between columns 6 and 7 for the two-foot stringer spacings.

Application to a two-lane bridge

The design loads shown in the table were compiled for a one-lane-traffic bridge. For a two-lane bridge where the inner wheels of passing trucks are assumed to be 4-ft. apart, equations 3 and 4 would necessarily require revision upward to allow for the effects of the adjacent, passing wheel. To make this revision, Equation D is changed to allow for the additional deflection of the adjacent stringer which is affected by the passing wheel. This will vary somewhat with the stringer spacing. Incidentally, it will be found that there is less discrepancy between the results of the A.A.S.H.O. specifications 3.3.1 and Equation 3 when applied to a two-lane bridge. The same objection applies here, however, as in the case of the one-lane bridge; namely, that it fails to take into consideration relative stringer-floor spans and stiffnesses.

Since the above formula was derived it has been learned that the Bridge Committee of the A.A.S.H.O. recognizes the shortcomings of those specifications that govern wheel load distribution. A study is now in progress looking toward a revision.

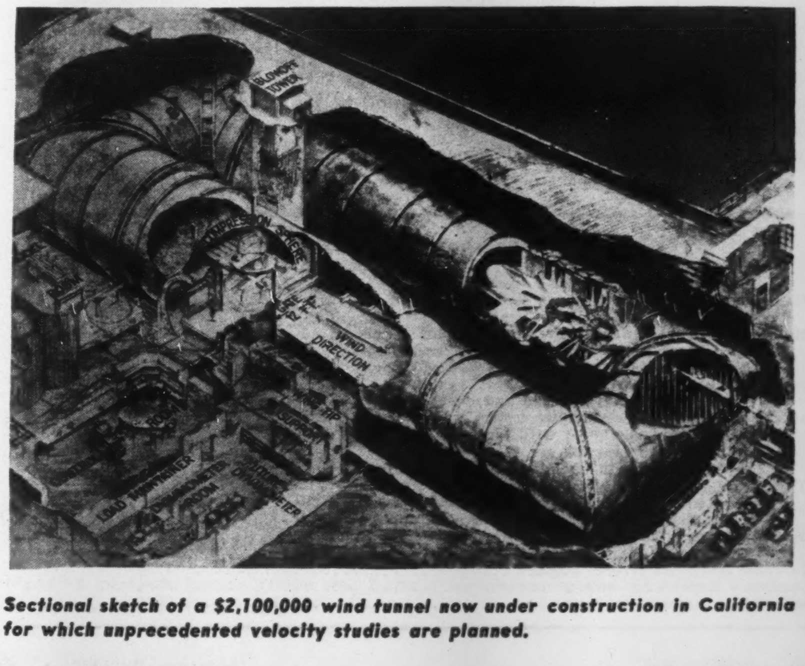
Wind Velocities of 740 M.P.H. Expected in New Wind Tunnel

wind tunnel in which it is prosed to develop higher velocities an ever before set up by fans for rodynamic study is under construcon in California as a joint enterise of major aircraft companies, cording to an article recently pubhed by the "Alumni Review" of e California Institute of Technolgy. This project, a $2,100,000 underking, is the first of two similar nnels, the other one being conucted at Buffalo, N. Y., under pervision of the Curtiss-Wright . In general, the design is that of elongated, rectangular doughnut, ing on the flat, utilizing the Venri principle and with motor-driven n blades in the large diameter secons arranged in two stages and iven by a very powerful electric otor.

The tunnel, which is a steel tube, of circular section in the larger ameters. The throat of the Venturi be, where the tests will be made, is ctangular. In the throat exact scale odels are to be supported on highly nsitive balances which will measure actions mechanically, electrically or ydraulically for all attitudes of the odel. From these data the flying characteristics of the prototype can be plotted, effecting enormous savings in time and cost in development of new models.

In the realm of velocities approaching the velocity of sound, it is said that careful aerodynamic investigations are advisable on all new models. It is at such speeds, on the order of 740 m.p.h., that tests are to be made in the new tunnel.

Under the direction of specialists on the faculty of the California Institute of Technology and with the cooperation of the Army and Navy, the project is being carried out by Consolidated, Douglas, Lockheed and North American aircraft companies.



Sectional sketch of a $2,100,000 wind tunnel now under construction in California for which unprecedented velocity studies are planned.

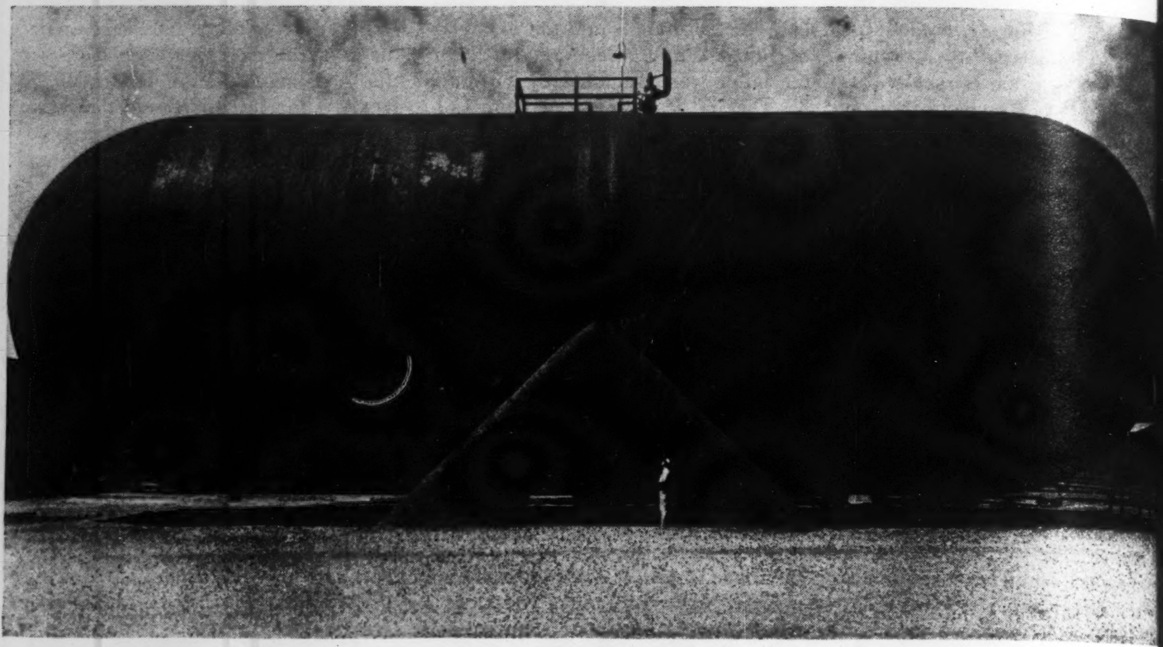


Fig. 1. A ring girder at midsection is the sole internal bracing and support for this fuel tank.

Ring Girder Support Takes Load on Tank

***Contents in Brief**—A 20,000-bbl. cylindrical fuel tank 115 ft. long and 38 ft. in diameter, slung from central A-frames, is figured for seismic forces and gas pressure in addition to usual dead, live and wind loads.*

A STEEL TANK for storing 20,000 bbl. of lightweight fuel, recently constructed for a large oil company, consists essentially of a horizontal steel cylinder with semispherical ends. The main stiffening and supporting member is a central ring girder from which the two halves of the tank are supported by cantilever action. The central ring, in turn, is carried by two pairs of inclined struts or A-frames made of steel tubes 38 in. in diameter. As the bracing afforded by these struts is in the longitudinal direction only, resistance to transverse thrust and to longitudinal swashing is provided by a shear button on the bottom of the central ring.

TABULATION OF PERMISSIBLE AND ASSUMED STRESSES

	Percent	Lb. Per Sq. In.
Maximum tangential stress at bottom		12,650
(Vapor pressure and static hear)		
Maximum stresses in circumferential girder seams		9,940
(Axial stress from vapor pressure and static head, plus stress from overhang and ribaction)		
Stress in head seams		10,700
(Vapor pressure, static head and overhang)		
Maximum stress in ring girder		
(From weight combined with longitudinal seismic impact)		
Tension in inner flange from bending		18,000
Compression in shell flange from bending		6,900
Tangential stress from vapor pressure		4,800
(These are not additive to the bending stresses as the bending deformations induce stresses of opposite sign.)		
Maximum stress in leg from gross weight		16,300
Increase from transverse impact	12½	
Increase from longitudinal impact	13½	
Allowable increase in stress	33½	

With this arrangement the entire weight is carried by the legs of the A-frame and the simple framing plan avoids indeterminate stress combinations. As the completed structure is symmetrical about the center line, the tank is reported to be "so well balanced that while supported on the erection rollers a man could start i rocking slightly by putting his back under one of the spherical ends and pushing up periodically."

The tank is for storage of a liquid with a specific gravity of 0.582 which is so volatile that it was desirable to design for an internal vapor pressure of 60 lb. psi. The designers considered this in combination with a seismic impact of 0.1 g.

The cylindrical shell, throughout, consists of $1\frac{1}{4}$-in. plate; the heads are made of $\frac{11}{16}$-in. plate. At the central ring girder there is a circumferential outside rider plate 84 in. wide and ½ in. thick.

The design took into account dead and live load in combination with wind or seismic impact, whichever was the greater. As seismic impact gives for greater loads in all cases, wind could be disregarded.

Shear resultant from longitudinal nd or seismic impact is taken up the A-frame struts which are 38- o.d. cylinders made of $\frac{7}{8}$-in. steel te. Shear from transverse wind or smic impact is carried by the shear tton at the bottom of the ring der, but this button does not per- t of any vertical load being trans- tted at this point. Other than the g girder, the only inside stiffening mbers are brackets at the legs and the shear button, Fig. 4.

Tank rotated during welding

The heavy ring girder at the cen- made it possible to use as tempor- y supports two pairs of heavy steel llers. This mounting made it con- nient to rotate the tank during lding operations, thus enabling the lders to do all of their work in the wnhand position. Seams in the nispherical ends could be done her in the horizontal position or th a maximum angle of 45 degrees the horizontal. This arrangement proved and expedited the welding erations throughout. Because the nk was rotated during assembly, ogress was more speedy, very little ging was required and hence the en were not exposed to as much zard as would ordinarily be the se in this type of construction. Fit- of the shell was expedited and de more accurate by the use of gle lugs spaced 10 degrees apart ng the edges to be joined. (On nilar tanks, where a pneumatic test s made, the rollers have been used rotate the tank for inspection and r painting before setting it in final sition).

In addition to the heavy rollers un- r the ring girder, pairs of light llers were set up toward the ends the tank as a safety measure dur- g construction. These additional llers were useful, during construc- n only, for carrying the load of en and equipment concentrated in e end. All rollers were removed, of urse, when the tank was completed. nce the tank is for storing liquid ly, it is expected that while it is in rvice the live load will be evenly dis- ibuted.

The tank was built by the Lacy anufacturing Co., Los Angeles, hose chief engineer, Wm. A. Sand- rg, made the designs. The designs ere checked by R. R. Martel, pro- ssor of structural engineering, Cali- rnia Institute of Technology.

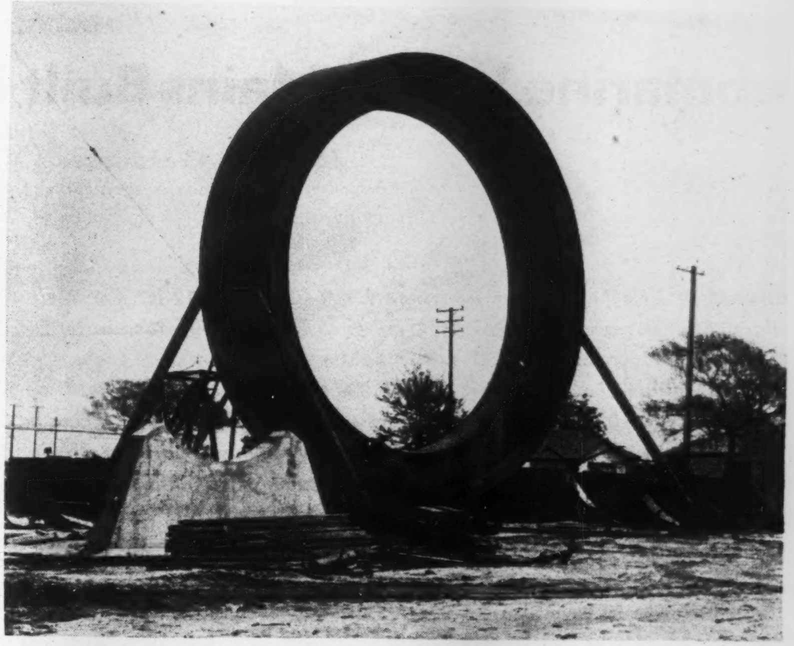


Fig. 2. The ring girder was erected first and the shell was attached, ring by ring. Here the ring girder is held in place by adjustable erection braces.

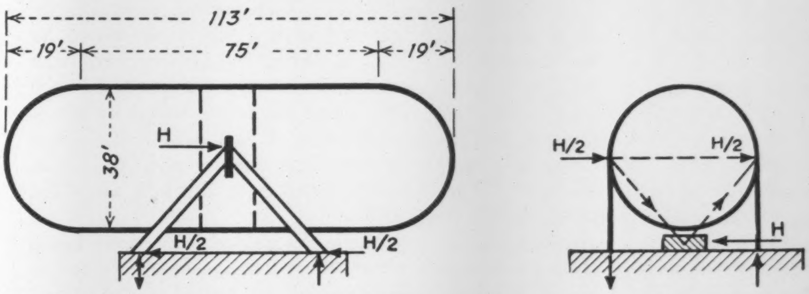

113'
19'
75'
19'
38'
H
H/2
H/2
H/2
H/2
H

Fig. 3. Outlines of the ring-supported structure with assumed resolution of forces.

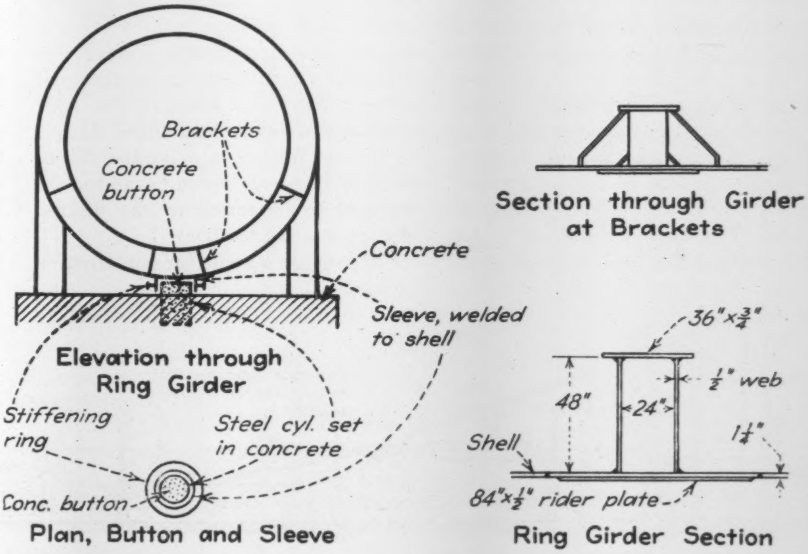

Brackets
Concrete button
Concrete
Sleeve, welded to shell
Elevation through Ring Girder
Stiffening ring
Steel cyl. set in concrete
Conc. button
Plan, Button and Sleeve
Section through Girder at Brackets
36"x¾"
½" web
48"
24"
Shell
1½"
84"x½" rider plate
Ring Girder Section

Fig. 4. A concrete button at the ring bottom resists transverse thrust but carries no part of the vertical load.

Submarine Water Mains Built in Deep Water

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Contents in Brief*—Wrought iron pipe for 9,600 ft. of 12-in. main near Portland, Me., was assembled in 200-ft. sections and placed in deep water by a "controlled buoyancy" method with a floating rig and special buoys, the sections being joined above water. Over 9,000 ft. of 8-in. and 12-in. cast iron main was built of 60-ft. sections joined below the surface by divers working in water as deep as 120 ft. For a 4,500-ft. temporary main, second-hand, $3\frac{1}{2}$-in. dia. boiler tubing was welded together on land and pulled into place by a tractor on the opposite shore.*

MUCH UNPRECEDENTED construction has been required near Portland, Me., in the installation of several miles of permanent submarine water supply mains in tidal water exposed to ocean weather and in places 120 ft. deep, which is believed to be a record depth for such construction. In addition, a 4,500-ft. temporary line of small size was built by a method considered unusual for a line of this length. Speed was a chief consideration on all operations and the work had to be done with such materials and equipment as were available. Furthermore, a tidal variation of 10 ft. had to be taken into consideration, as were low temperature during a winter that proved to be of record-breaking severity.

The work was part of a program to provide a water supply for several islands. The first pipeline built, 9,600 ft. long, extended across an area where water as deep as 40 ft. was encountered. In order to keep clear a future navigation channel, 2,000 ft. of the line had to be laid in a trench from 12 to 15 ft. deep. To eliminate danger from freezing and other possible damage, the land sections of the pipe were buried in a 5-ft. trench.

Because it was readily obtainable, 12-in. dia. wrought iron pipe was selected for this line. The pipe was delivered in 20-ft. lengths and ten of these sections were butt welded together on land to form 200-ft. lengths (Fig. 2). Each welded joint was reinforced with a sleeve as shown by Fig. 3. After the sleeves had been added, a $\frac{1}{4}$-in. tap was made in each sleeve and the joints tested by air at a pressure of 150 psi. in the space between the sleeve and the pipe, which tested both the butt and fillet welds.

While the welded joints were being tested, forged flanges were welded to each end of the 200-ft. sections. Following the testing, the pipe was coated on the outside with a thick grease and wrapped in a heavy, bituminous-impregnated paper to minimize corrosion from the salt water (Fig. 4). Finally, the ends were sealed by bolting blind flanges to the end flanges to make the 200-ft. sections buoyant, which permitted the sections to be towed to the desired site by a small towboat.

To provide a guide for construction of the pipeline, dolphins consisting of three timber piles were driven on 150-ft. centers parallel to the line and a few feet to one side. An exception was a 400-ft. section left open for navigation. Three derrick lighters were utilized on construction of the pipeline; one lighter, equipped with a 1-cu.yd. clamshell bucket, did the excavation and backfill, and the other two laid the pipe.

Laying operations for the longer of the two water crossings began near shore in shoal water. As a first operation, 600 ft. of pipe was assembled in one section, floated into position and then sunk by introducing water at the shore end, the only support being a raft that kept the forward end of the pipe above water. For the next few hundred feet, 200-ft. lengths were added one at a time by the floating derricks. These derricks, one working at each end of the section being added, raised the pipe above the water to the proper angle to permit the flanged connection to be made.

Buoy support pipe in deep water

This method was satisfactory in shallow water, but when deeper water was encountered a different procedure had to be followed to prevent over-stressing of that portion of the pipe extending from the bottom of the trench to the surface. A method called "controlled buoyancy" (Fig. 1) was used. It consisted of supporting by buoys the 300 to 400 ft. of pipe reaching from the raft at the

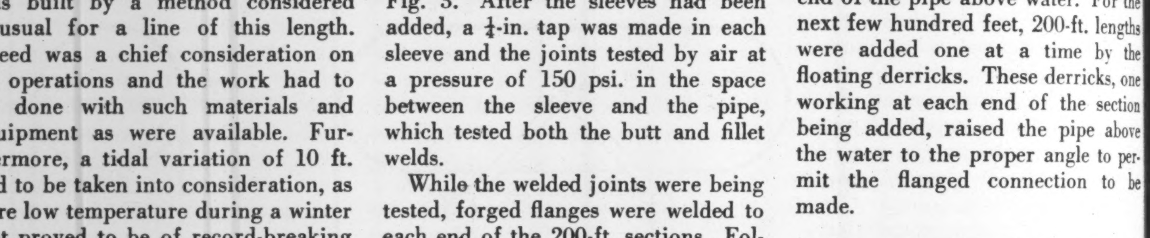
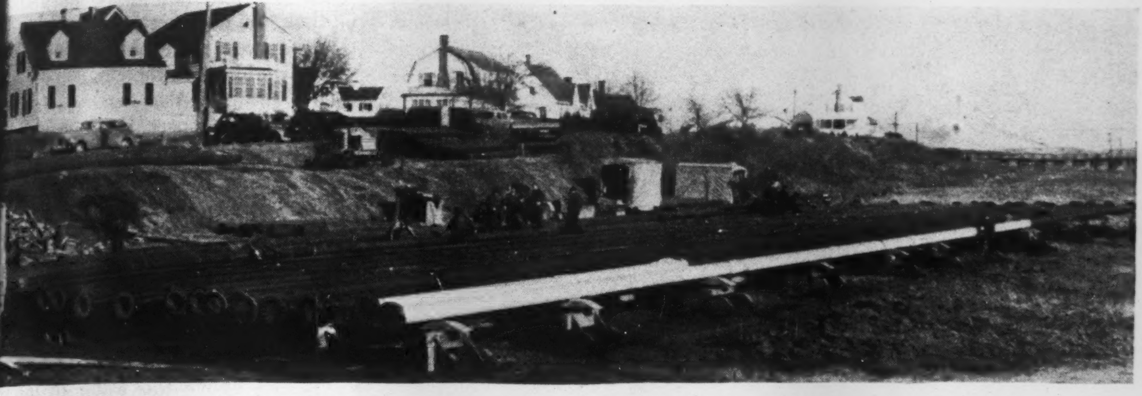


Fig. 1. A long length of 12-in. dia. wrought iron pipe was laid in open water by a "balanced buoyancy" procedure using buoys of type shown by Fig. 3.



g. 2. Wrought iron pipe was assembled on land in 200-ft. sections, joints being welded and equipped with sleeves.

rward end to the bottom of the ench.

The buoys (Fig. 3) were built pecially for the work from steel ine-net floats borrowed from the S. Coast Guard. A typical buoy d a maximum lifting power of 800 lb. It consisted of a 300-gal. at surmounted by a timber quadru- d equipped with a belaying pin ar the top.

A 1½-in. suspender cable "dead ded" at the belaying pin, extended wn one side of the barrel and rough a link on the bottom of the rrel, thence through an eye in a od block attached to the pipe, next ward through the link, and finally the opposite side of the drum to e belaying pin. This arrangement ld the quadrupod vertical. It also rmitted adjustment of the suspen- r above water when the buoy was bmerged by several feet, thus, per- itting more flexibility in the opera- ons.

The buoys were spaced 65 to 70 ft. art. They caused the pipe, which ted as a beam, to maintain a uni- rm curve, concave upward, without ceeding the allowable stress in the pe. The maximum safe curvature th the 12-in. pipe filled with water as of 1,250-ft. radius. The buoys d not support the total weight of e filled pipe by a considerable mar- n, as removal of the raft supporting e foward end would allow the pipe sink. Because of this condition, wering of the pipe was effected by ving the raft forward with the dition of each new section. As more pe came to rest on the bottom of e trench, the rear buoy was re- ased, moved forward and re-used.

In following this method, it was of tmost importance that the suspen-

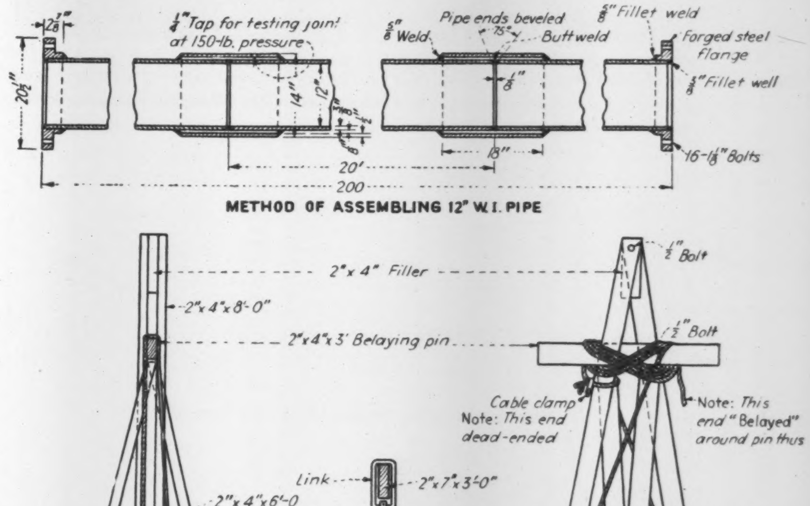

2⅞"
20½"
¼" Tap for testing joint at 150-lb. pressure
14"
12"
⅝" Weld
Pipe ends beveled
75°
Buttweld
⅛"
18"
⅝" Fillet weld
Forged steel flange
⅝" Fillet well
16-1⅛" Bolts
20'
200
METHOD OF ASSEMBLING 12" W.I. PIPE
2"x 4" Filler
2"x 4"x 8'-0"
2"x 4"x 3' Belaying pin
½" Bolt
½" Bolt
Cable clamp
Note: This end dead-ended
Note: This end "Belayed" around pin thus
Link
2"x 7"x 3'-0"
Buoy
Detail of connection to buoy
2"x 4"x 6'-0
Tower
Link
2 pcs. 2"x 4"x 3'
½" Bolts
2"x 7"x 3'
Buoy
5'-11"
300 Gal. steel buoy
4'-4"
6"x 6"x 16' Wood block
½ Safety cable
Suspender cable
Rope lashing
Front elevation
Side elevation
DETAIL OF BUOY AND TOWER

Fig. 3. The 12-in. dia. wrought iron pipe was assembled in 200-ft. lengths by welded joints of type illustrated at the top. Buoys used to lay pipe were built from mine-net floats.

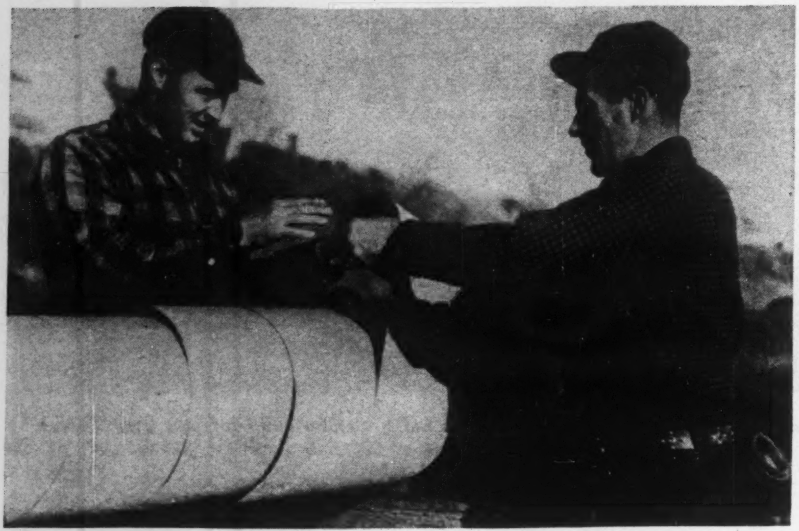


Fig. 4. To provide protection against salt water, 200-ft. sections of wrought iron pipe were coated with heavy grease and wrapped with bituminous-impregnated paper.

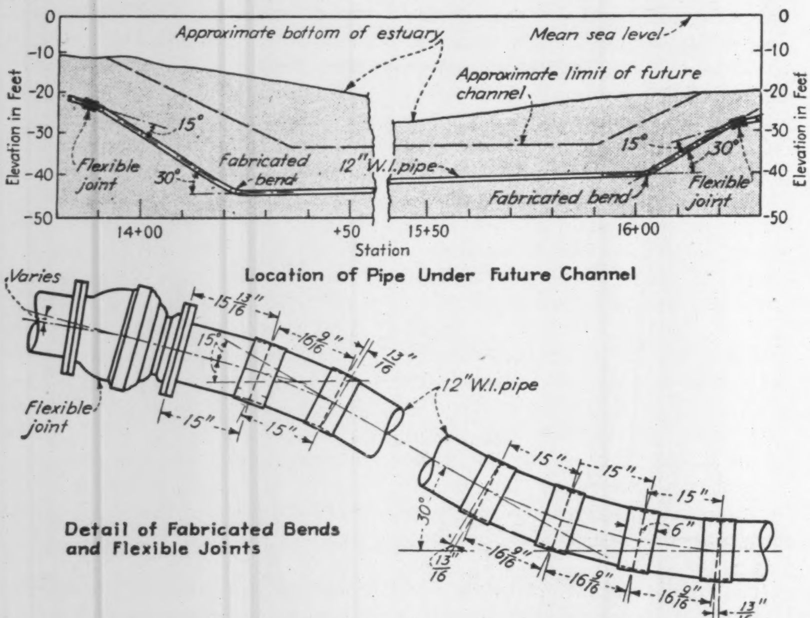

0
-10
-20
-30
-40
-50
Elevation in Feet
Approximate bottom of estuary
Mean sea level
Approximate limit of future channel
15°
30°
Flexible joint
Fabricated bend
12" W.I. pipe
Fabricated bend
15°
30°
Flexible joint
14+00
+50
15+50
16+00
Station
Location of Pipe Under Future Channel
Varies
15 13/16"
16 9/16"
13/16"
15°
Flexible joint
15"
15"
12" W.I. pipe
15"
15"
15"
6"
30°
13/16
16 9/16"
16 9/16"
16 9/16"
13/16"
Detail of Fabricated Bends and Flexible Joints

Fig. 5. Across an estuary where a future navigation channel is planned, a 250-ft. section of 12-in. dia. wrought iron pipe was assembled in a "U" section with fabricated bends and laid in a deep trench.

ders attached to the buoys be progressively slackened away to keep the belaying pins from becoming submerged. During the slackening process, the outside turn of the suspender cable on the belaying pin was loosened slightly to allow other turns to render. This operation caused an irregular slackening motion and involved considerable impact, which, together with wave action and the currents, tended to cause the suspenders to cut through the eyes of the wood attachment blocks on the pipe. In one instance two blocks failed in quick succession, causing the pipe to rupture close to a flanged connection. As a safety measure, a "preventer" consisting of a loop of wire rope passing around the pipe and through the suspender bight was used. This loop of wire carried the load if a block gave way.

The "controlled buoyancy" method permitted rapid construction under the conditions encountered. A 200-ft. section was laid daily much of t time and on several days 400 ft. co have been placed but for the harb restriction that the contractor's flo ing equipment be removed from t site before sunset. However, the av age progress was considerable r duced by adverse weather, cavi trench, and shortage of experienc labor.

Construction of the pipeline b means of buoys continued to sho water on the opposite shore. The fin 600 ft. of pipe was floated into pla at high tide as a single section a joined above the water to the pi already laid. It was allowed to f slowly with water while supported b lighters and buoys and to settle slow into the trench.

Methods offer several advantages

Advantages of the "controlle buoyancy" procedure proved to b

1. Divers were not required for lay ing pipe, as jointing was done abov water.
2. During storms when the floatin equipment had to leave the site o operations, the pipe did not have t be lowered to the ocean bottom an subsequently raised.
3. The method was economical fo the type of pipe that had to be lai and the severe winter working con ditions encountered.

One line added as unit

A shorter line of the same type o pipe was constructed across a tida estuary by an uncommon method. I building this line the constructio procedure had to provide for futur deepening of a navigation channe This problem was solved by construc ing on shore a "U" section about 25 ft. in length with fabricated bend at the bottom of the U and a combina tion of fabricated bends and cast iro ball joints at the upper ends of th U (Fig. 5). The ball joints were pro tected against overstress by means o timber strongbacks that limited th movement of the joint. These strong backs were left in place.

When completed the U was floate into place. At slack tide it was fille with water while being supported a each end by a lighter. The ends wer supported above water level until th section was joined by bolted connec tions to the adjoining pipe.

At the channel location the tida conditions were severe, and at lo water the available working space wa limited by the presence of tidal flats. Also floating ice, occasioned by the extremely cold weather, greatly hampered the work. In addition the ocean bottom at the channel location was soft silt of a type that caved badly. As a result of all these factors, excavation of the trench, which had to be made 25 ft. deep, was very difficult.

To check the grade of the pipe, which was almost immediately covered by washed-in silt, light lines were tied to the pipe at several points. These lines had reference points at the proper distance from the pipe. When the lines were held vertically, the grade of the pipe could quickly be determined.

At each end of the two water crossings just described expansion joints were provided (Fig. 6). Each joint was housed in a concrete chamber. A slip joint was provided through the wall on the water side, whereas the pipe was anchored to the landward wall.

Much work in deep water

On more recent construction, 9,000 ft. of 8-in. and 12-in. heavy-duty cast iron main with flexible joints of "Usiflex" design was laid in a 5-ft. trench in water as deep as 120 ft., which is considered a record depth for this type of pipe (Fig. 7). A much different but equally satisfactory laying method was used for laying pipe in this section of the project. The procedure followed for 4,500 ft. of the 8-in. main, which was typical of the other cast iron pipe, will be described.

This line was built in an exposed location where bad weather, strong tidal currents and wave action were encountered. Damage to twelve submarine cables beneath which the pipeline was to pass also had to be avoided when dredging the necessary 5-ft. trench and in laying the pipe.

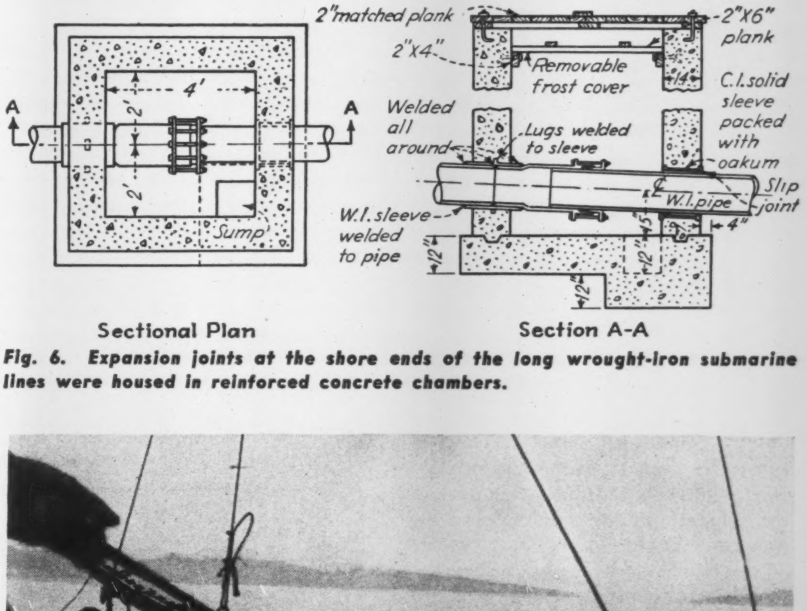
As a first operation, divers made a preliminary exploration of the ocean bottom. This investigation required the divers to work at a depth of as much as 120 ft., or much deeper than most divers care to descend under the conditions encountered. Because of the poor light at that depth, the men had to work almost entirely by their sense of touch. They had to locate and mark with buoys the submarine cables, which were widely scattered.

The required trench was dredged by a crawler crane equipped with a 1½-cu.yd. clamshell bucket. It operated from a 30 x 110-ft. timber scow moored from each corner by ¾-in. cables each about 600 ft. long (Fig. 8). The outer end of each of the mooring cables was attached to a timber float constructed of four 12 x 12-in. by 15-ft. spruce timbers bolted together. In turn, each float was attached by about 125 ft. of 1-in. cable to a mooring stone weighing from 4 to 6 tons. This method of mooring permitted the mooring lines to be disconnected above water when the scow had to be moved and the lines had been slackened. The scow was held in position and alignment by adjusting the length of the mooring cables with two double-drum deck engines, alignment being obtained from targets on shore.

In deep dredging, an ingenious apparatus was used to aid in keeping the clamshell bucket in line and to eliminate twist in the cables. A 1,500-lb. weight was suspended in vertical guides on the rear of the scow and a set of double blocks was attached to the weight so as to permit a vertical movement of about 10 ft. The lead line from the blocks was extended under the barge to the bucket. The line was kept clear of the bottom of the scow by roller guides mounted in a pivoted frame, which could be swung clear of the bottom of the barge when not in use.

The excavated material was raised about 10 ft. above the ocean floor and swung through the water about 20 ft. to the side. This distance proved sufficient to avoid extensive backwash and left the material convenient for backfilling. About 15 ft. of trench could be excavated without the barge having to be advanced. Once this length of trench was dug, the barge was moved forward by the two double-drum winches, this operation requiring about 5 min.

After about 300 ft. of trench had been excavated, it was necessary to shift the mooring anchors to permit



Sectional Plan

Section A-A

Fig. 6. Expansion joints at the shore ends of the long wrought-iron submarine lines were housed in reinforced concrete chambers.

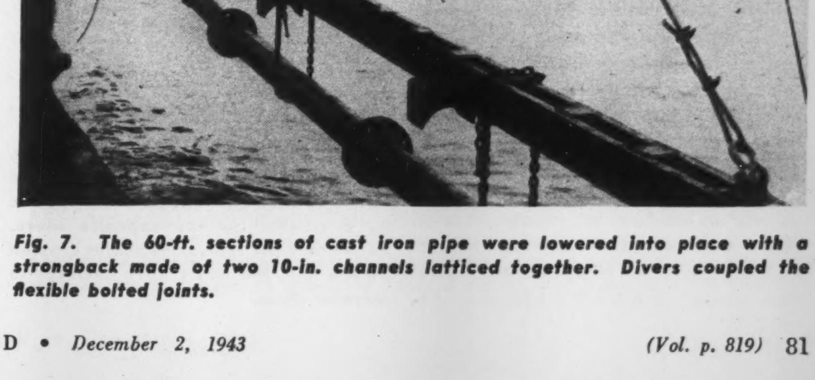


Fig. 7. The 60-ft. sections of cast iron pipe were lowered into place with a strongback made of two 10-in. channels latticed together. Divers coupled the flexible bolted joints.

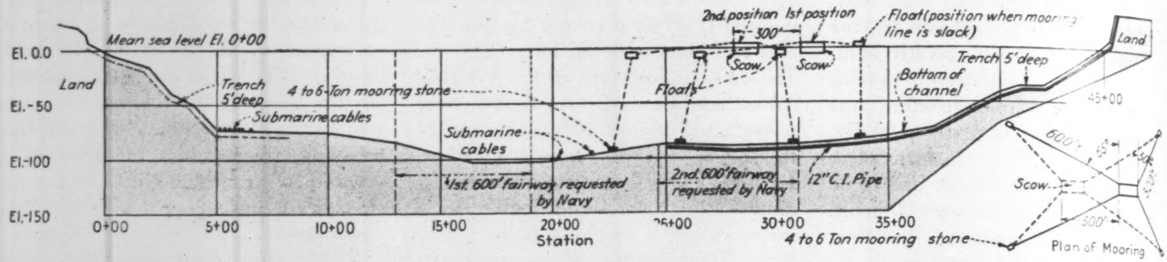

2nd. position
1st position
300'
Float (position when mooring line is slack)
Land
Mean sea level El. 0+00
El. 0.0
El. -50
El. -100
El. -150
Land
Trench 5' deep
4 to 6 Ton mooring stone
Submarine cables
Submarine cables
Floats
Scow
Scow
Trench 5' deep
Bottom of channel
45+00
1st. 600' fairway requested by Navy
2nd. 600' fairway requested by Navy
12" C.I. Pipe
0+00
5+00
10+00
15+00
20+00
25+00
30+00
35+00
Station
4 to 6 Ton mooring stone
600'
65°
300'
300'
Scow
Plan of Mooring

Fig. 8. A crawler crane, operating on a barge placed 60-ft. sections of 12-in. dia. cast iron pipe in water as deep as 120-ft., the sections being joined by divers. Barge was moored at the corners and moved ahead by two deck winches as work advanced.

the work to continue. This operation consumed about one hour. The procedure followed was to disconnect the lines at the floats. Next, the anchors were raised one at a time by the crane on the barge and moved ahead as far as desired, the barge being shifted by a small tugboat.

About 300 ft. of trench was excavated daily in good weather. The usual procedure was to excavate enough trench for one or two days work and then to use the same equipment to lay the pipe until more trenching was required.

Divers make connections

The laying procedure followed required that some connections be made underwater by divers. The pipe arrived on the job in 12-ft. lengths. It was assembled in 60-ft. sections on the barge to reduce the number of connections that had to be made below the surface. The 60-ft. sections then were tested with air pressure.

These sections were handled by a 60-ft. long strong-back made of two 8-in. channels placed back to back a few inches apart and latticed together. The strong-back was equipped with chains spaced at 12-ft. intervals to support each length of pipe between the flexible joints (Fig. 7). One end of each chain was fixed permanently to the strong-back and the other looped under the pipe and hooked into a V-shaped slot in an ear welded to the strong-back. This arrangement permitted the strong-back to be unfastened quickly from the section once the pipe had been joined to the completed portion of the line.

To guide the sections into place as they were lowered to the ocean floor, a whipline of the crane was attached to the free end of the pipe already placed and held taut. Next, a short chain was passed around the spigot end of the pipe being lowered and then looped around the whipline. As the section of pipe descended, the chain guided the spigot end to within a few feet of the bell end of the last section laid.

The diver could readily maneuver the pipe into final position to make a bolted joint of the same type as that used for joining the sections above water. After the joint, which was of the "Usiflex" type, had been made, the whipline was shifted to the forward or free end of the section just added to aid in laying the next 60-ft. section.

When working in 60 to 120 ft. of water, it was necessary to limit the pipe laying to 120 ft. per day owing to the swift tidal currents and great pressure encountered by divers at these depths. This latter progress required that two joints be made under water each day. Two divers were employed, each workman descending once daily to make one connection per trip. While working at these depths, the divers required about 45 lb. of air pressure. They spent about 5 min. in descending and about 45 min. in ascending. As a safety measure, a decompression chamber was set up on the barge for use by the divers to avoid the occurrence of "bends."

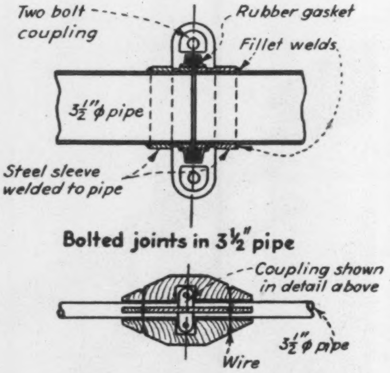

Two bolt coupling
Rubber gasket
Fillet welds
$3\frac{1}{2}''\phi$ pipe
Steel sleeve welded to pipe
Bolted joints in $3\frac{1}{2}''$ pipe
Coupling shown in detail above
$3\frac{1}{2}''\phi$ pipe
Wire
Wooden shoes used on $3\frac{1}{2}''$ pipe

Fig. 9. For a 4,500-ft. temporary main, 350-ft. sections of 3½-in. tubing were joined and the line was pulled into place by a tractor on the opposite shore. To protect the submarine cables crossed by the line, the joints were enclosed in wooden shoes.

In 60-ft. depths 180 ft. of pipe was laid daily much of the time and 240 ft. was laid occasionally.

Construction of the last portion of the 8-in. main to be laid by the method just described is now nearing completion. The 12-in. line built by the same method is ready for service. Before the work just described was begun, a major difficulty was anticipated in excavating the trench and laying the pipe because of the great depth of water encountered. However, progress to date shows that the method is highly satisfactory with the type of pipe used. The procedure also has permitted rapid construction.

Long Line pulled into place

Another pipeline of interest is a temporary line 4,500 ft. long between two islands. In many places it is in water 120 ft. deep. The line was pulled into place by a tractor, which is a method considered unique for a line of this great length and small size. As a wartime expedient, it was constructed of second-hand, 3½-in. dia. steel boiler tubing. Near shore the pipeline was buried to protect it from freezing and wave action, but elsewhere it was laid on the ocean floor.

The tubing was delivered to one island in sections about 18 ft. long. Near the water's edge the sections were joined by butt welding to provide 350-ft. sections. The long sections in turn were joined by welding to each pipe a grooved sleeve and then joining the sleeves with "Victaulic" cast iron, two-bolt coupling equipped with a rubber gasket (Fig. 9). The 350-ft. sections were coated with an asphalt paint containing asbestos fibers.

The work of pulling the pipe into place required only two days once this operation was begun, but preparations required more than a month. Much of this time was spent in building on shore a timber-frame chute about 350 ft. long which was required because of the steep and irregular bank. It also provided a platform on which to join the short sections, the long sections being left on the chute until needed. The chute was supported on timber bents spaced about 10 ft. apart.

To start the pulling operations, a 5,000-ft. length of ¾-in. cable was extended to the second island and attached to a 10-ton crawler tractor. After 350 ft. of pipe had been pulled into the water, another section of about the same length was added and these operations repeated. Work continued 24 hr. per day and in two days the entire line was in place.

Submarine cables also existed in the area crossed by this line, and the pipe had to be placed under the cables without damaging them. Before the pipe was pulled into place, the cables were grouped and securely bound together. As another precaution to prevent damage to the cables, the protruding joints where the 350-ft. sections of pipe were joined were covered by tapered wooden shoes (Fig. 9), which permitted the tubing to slide over the cables. Once the pipeline was in place, the tubing was cut by divers with hack saws at each group of cables and the cables placed above the pipe. Finally, the ends of the tubing were joined by Dresser couplings.

Small line proves satisfactory

No breaks occurred in the 3½-in. tubing while it was being placed. Neither did leaks develop when the main went into operation at pressures up to 115-psi. at the lowest point in the line.

Since the temperature of the seawater at this location has been known to reach 28 deg. F., and freezing of unburied pipe lines has been experienced, provision was made for the installation of electric heaters in the land portion of the pipeline. These units were planned to raise the temperature of the water sufficient to keep it above 32 deg. during its passage through the pipe to the next island. However since the winter was nearly over when this line was placed in service, installation of the heaters was found unnecessary. A close watch of seawater temperatures revealed that the temperature did not go below 33 deg. after the line was placed in service, although the air temperature dropped to 40 deg. below zero.

After six months, operation of the line continues to be satisfactory. Cost of the 4,500-ft. project was $20,000, including cost of the tubing, its installation and the contractor's fee.

Total cost of all the work described was $900,000. The projects were financed and supervised by the Federal Works Agency. J. A. McConnell, assistant regional director for FWA at Boston, Mass., was in general charge, and the writer, as project engineer, in direct charge.

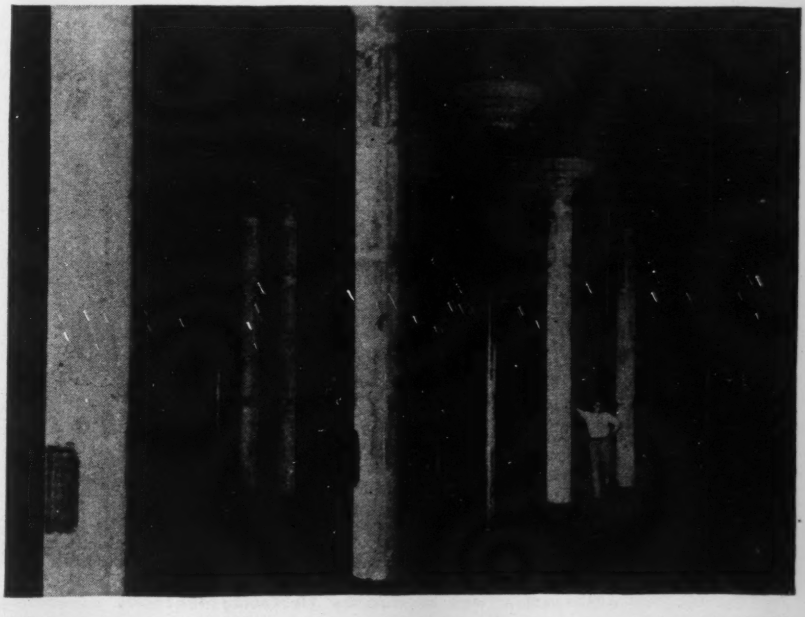
Metcalf & Eddy, Boston, Mass., were consultants. For that firm Harry L. Kinsel was in charge of design, E. B. Cobb resident engineer during early stages, and Neil A. Medbery resident engineer during the latter part of the work. Harry U. Fuller is chief engineer of the Portland Water District, which is supplying the water.

Construction was by four contracts by the following firms: Bennett Contracting Corp., Portland, Me.; George M. Byrne, Boston; Spearin, Preston & Burrows, New York, and Wyman & Simpson, Augusta, Me.

Fuel Tanks Lined With Synthetic Rubber

Synthetic rubber is now being used to seal the large underground concrete fuel storage tanks the Navy is building in this country and at strategic overseas bases. While heavy fuels presented no storage problem, light fuels such as diesel oil and aviation gasoline tended to seep through the pores of the concrete. High octane gasoline, moreover, suffered a serious drop in octane rating and formed a sticky gum when exposed to the alkaline present in the concrete. Intensive research by Thiokol Corp., Trenton, N. J., resulted in a synthetic rubber lining which, when applied to the walls, floor and columns of the tank not only protected the gasoline but formed a seal which remained leakproof even when the concrete wall cracked.

Application of the lining resembles the hanging of wallpaper. After all surface irregularities have been removed, the tank walls are coated with a special synthetic rubber cement, developed by the Boston Woven Hose Co. When the cement has thoroughly dried and a second coat of the adhesive has reached the right stage of tackiness, the concrete is covered with a single thickness of the rubber.



Reinforced-concrete tanks to store high octane gasoline are sealed on the inside with synthetic rubber to eliminate contact between the fuel and the concrete.

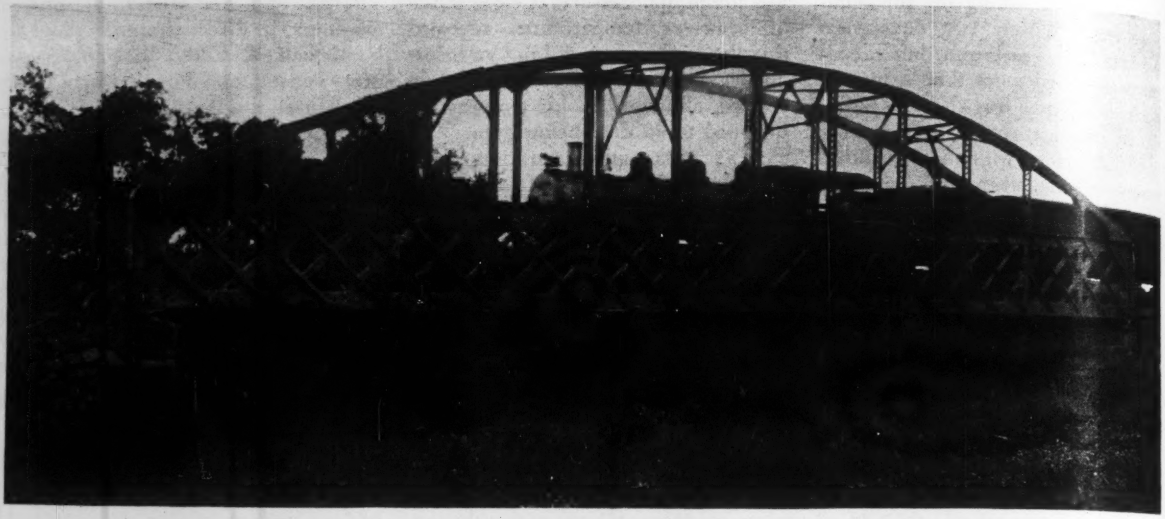


Fig. 1. This old bridge over the Iraí River was strengthened by superimposing a flexible steel arch on top of the old trusses.

Railroad Bridges Reinforced in Brazil

Contents in Brief—*Old railroad bridges in Brazil were reinforced to carry increased train loadings without interrupting traffic. Plate girder spans were converted into trussed structures, simple trusses were strengthened by superimposing a flexible steel arch on the top chords, and simple span girders and trusses were made stronger by adding a central pier.*

AN INTERESTING EXAMPLE of an economical program of bridge strengthening is the recently completed work of reinforcing 34 major structures on the Parana Railroad in the State of Parana, Brazil. Although this single track railroad carries an average of 46 trains per day, all reconstruction work on the bridges was accomplished without stopping or delaying a single train movement.

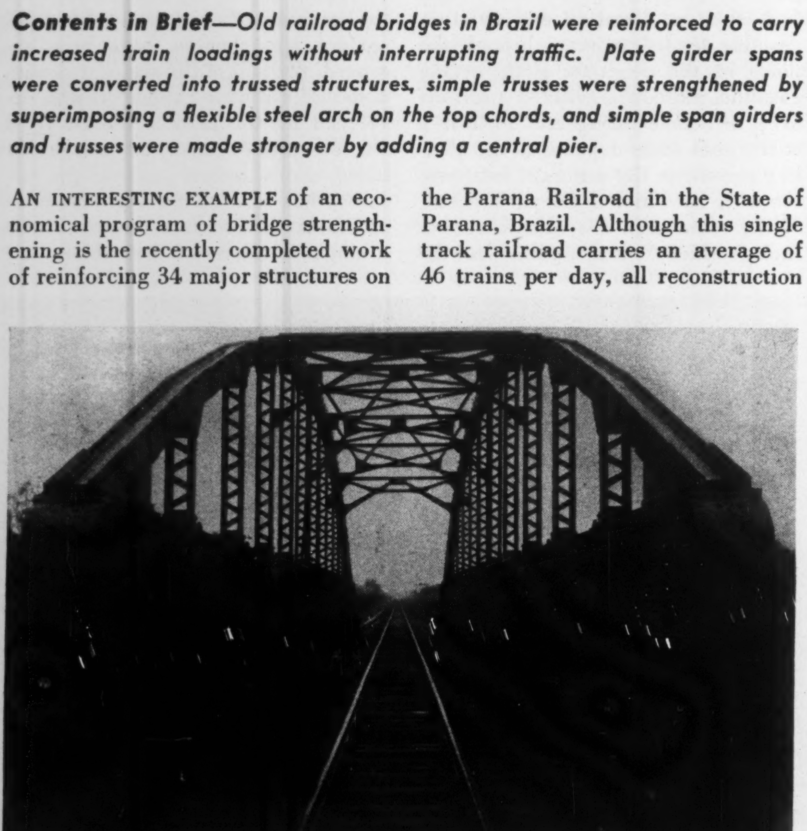


Fig. 2. Positive arch action was insured by tightening the bolts connecting hangers to the old top chord. New top chord bracing and sway frames provide ample rigidity for arches.

Each structure was investigated separately as to the best means of providing the required increased strength, and although local conditions varied at the several sites, it was found that most repair and improvement work fell in one of three general categories: (1) simple truss reinforced by superimposing a flexible arch on its top chord, (2) steel plate girder changed into a trussed structure by adding adjustable tension members beneath the bottom flange, and (3) truss or plate girder converted into a continuous structure by installing a central masonry or steel support.

Strengthening simple trusses

When reinforcing simple through trusses by adding a flexible arch on the top chord, as shown in Figs. 1 and 2, the theoretical stresses in the structure were calculated from influence lines obtained by considering the original trusses acting as stiffening members. Initial stresses were introduced in the arch by tightening bolted connections between the hangers and old girders. This insured positive arch action throughout the structure. As a check on the computed strength of the reinforced tructure, extensometer measurements ere made both before and after intallation of the flexible arch for the ame conditions of loading. These easurements showed a great reduction in stresses and they also indiated a fairly good agreement with he computed values. Deflections at id-span were decreased to one-ourth of their original values.

Trussed plate girders

Conversion of a built-up plate irder into a trussed structure was ffective for strengthening floorbeams, tringers and for both deck and hrough girders of not more than 00-ft. span. As shown in Fig. 3, new earing devices were installed at the butments to connect the end tension embers to the bottom flange of irder. Short stub-verticals, braced ransversely with cross-frames, were laced at approximately the ¼ points o provide truss action in the strucure. Initial stress was induced in he reinforcing members by tightening the turnbuckles joining the tenion members at the center of span.

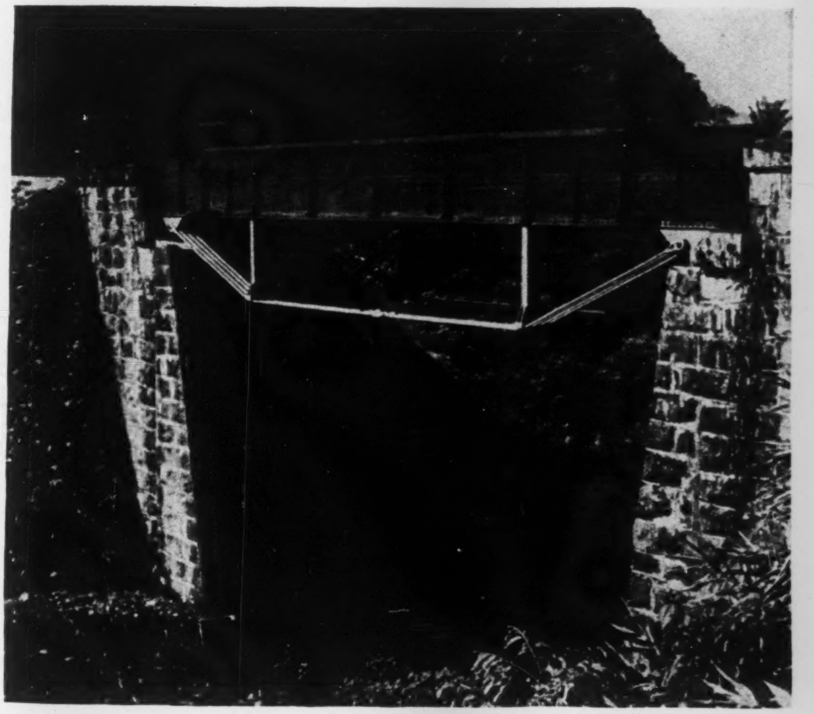


Fig. 3. *Increased carrying capacity of simple plate girders was provided by attaching trussed, tension members underneath the bottom flange.*

Two-span continuous bridges

Relatively little remodeling of the ld structure was necessary where conditions permitted the conversion of a simple-span truss or girder into a wo-span continuous structure, as hown in Fig. 4, by constructing a entral masonry or steel column support. Web members at the center of russ span required reinforcing or eplacing, for compression. The old hord sections usually were found adequate for reversal of stresses due to continuity. One very necessary procedure in remodeling this type of bridge was the addition of concrete counterweights at the abutments, supported on old railroad rails, to provide for live load negative reactions, and to avoid hammering. Deflections and stresses were reduced in the same proportions as before.

In addition to the non-interruption of railroad traffic during the reconstruction of the bridges, the total cost of improvements, including minor general repairs, was relatively low; varying from 25 to 40 percent of the cost of new structures having the same carrying capacities.

Designs and investigations for strengthening these old railroad bridges were made under the supervision of Oscar Machado da Costa, designer of bridges, Parana, Brazil. Mr. da Costa supplied *Engineering News-Record* with the pictures and description of this work through D. B. Steinman, consulting engineer, New York.

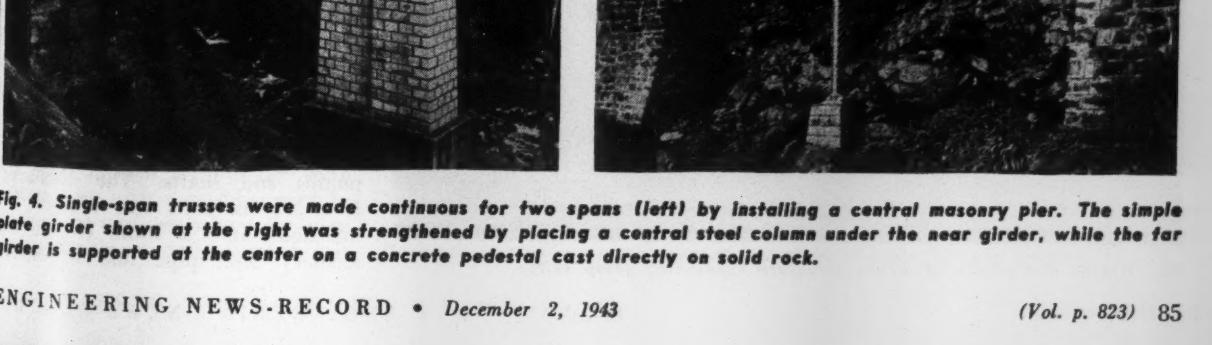


Fig. 4. *Single-span trusses were made continuous for two spans (left) by installing a central masonry pier. The simple plate girder shown at the right was strengthened by placing a central steel column under the near girder, while the far girder is supported at the center on a concrete pedestal cast directly on solid rock.*

Cantilever Bridge Built to Support Pumps At Intake of Water Supply System

C. S. Glazbrook
J. M. Montgomery & Co., Los Angeles

***Contents in Brief**—To provide for wide differences in water level at the intake of a water supply system, a cantilever bridge was built and on its outer end was placed a pump house from which pumps were suspended below lowest water level. Six pumps were put in with a total capacity of 56 sec.ft.*

UNUSUAL CONDITIONS had to be met in the design of an intake structure for a 30-m.g.d. water supply system recently built to serve an industrial plant. The pump lifts required from the source of supply in an impounded lake ranged up to 987 ft., of which 350 ft. was taken by the intake pumps and the remainder by a booster pumping station in the 17-mi. pipe line from source to point of delivery.

The wide variation in water level at the source led to a study of various possibilities in the intake structure design. Those most carefully examined were (1) an incline on which pumps could be mounted and which could be extended downward as the water level lowered, (2) a pile trestle at some site suitable for extending it out to the required depth, (3) a floating barge anchored in water of the required depth, (4) a vertical excavated shaft with a horizontal tunnel at its bottom extending out to the low water level, (5) a cantilever structure from whose outer end pump columns could reach down to the required low level. A factor in the decision was the need for speedy construction that would have to be done while the water level was near its upper limit.

In comparing the relative merits of the possible solutions, every endeavor was made to weigh reliability for continuous, uninterrupted service, as well as initial and maintenance costs. These comparisons resulted in selection of the cantilever structure as the most desirable solution.

Accordingly, a site was selected on a rock cliff where a cantilever structure with a 233-ft. arm would extend out to a point where the low water level could be reached by vertical columns. To keep the foundation loads within reasonable values a 154-ft. anchor arm was used on the inshore side of the cantilever pier.

The bridge was designed, in the main, for H-15 highway loading with special provision, of course, for loads imposed by the pump house, pumping units and discharge line. The structure was analyzed for resistance to earthquake shocks producing horizontal forces of 0.1g. Open steel grid was selected for the floor, and a nonskid plate floor with removable sections (for access and repairs) was used in the pump house and the outside walkways.

In designs taking into account the weight suspended from the outer end of the cantilever arm, it was decided that the only practical method was to consider the six pumps and their water columns as being hinged at the pump house floor. Provision was made for the installation of relatively light horizontal ties between the six pump columns at approximately 20-ft. intervals as the lake level lowered.

To meet the 30-m.g.d. requirement with desirable margin, six 4,200-g.p.m. vertical centrifugal pumps, each with an 18-in. column, were installed in an insulated sheet metal enclosure at the end of the cantilever arm. A 15-ton overhead crane was put in for handling the motors, pumps and shafts. The discharge from all six units was brought by manifolds into a 40-in. (inside diameter) steel pipe line suspended

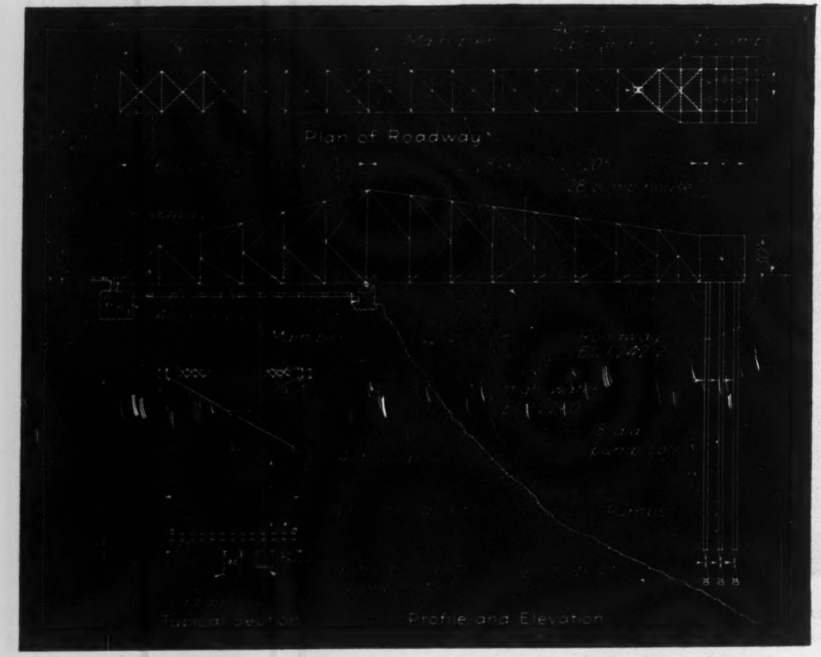


Fig. 1. Plan and profile of intake structure supporting pump units.

below the floor beams of the cantilever arm. This pipe was slung from hanger saddles with hinges at the top to provide for temperature variations. One expansion joint was provided. This is at the third panel from the end of the cantilever where the pipe was welded to the lower chord truss braces.

Riveted trusses with web systems of the "K" type were selected for the cantilever structure. An analysis of secondary stresses, made as the design proceeded, indicated relatively high stresses in the truss members near the main bearing pier and in the subdivided panels at the end of the cantilever arm. The anchor arm of the bridge was connected to the anchor pier by links, making this arm free to move longitudinally.

The weight of concrete in the anchor pier was computed without regard to the effect of being keyed into the rock and was made sufficient to counter-balance one and one-half times the total load for which the bridge was designed.

Temperature stresses in the bridge itself are negligible except at the main pier floorbeam in which special provision was made for the additional stresses set up by temperature changes.

It was decided to detail the trusses for their true geometric form, assuming that the trusses would take this shape under the conditions of dead load plus one-half live load. Accordingly, chord splices, which were assembled in the shop, were reamed to their true geometric form, with connections for the web members in the gussets reamed to metal templates laid out also to this form (*Transactions,* Am.Soc.C.E., 1922, p. 409). Following this procedure made it seem unnecessary to use additional metal for secondary stresses.

The anchor arm was located partly in a channel excavated in rock. Steel for this arm was assembled on low stands of timber blocking by means of a crawler crane operating alongside the channel. The outer arm of the structure was erected as a cantilever, using a light, stiff-legged derrick traveler equipped with a 60-ft. boom. The heaviest lift was the bottom chord members which weighed 23½ tons. Total weight of structural steel in the bridge, exclusive of the open grid flooring, was 942 tons.

J. M. Montgomery & Co., Los Angeles, were engineers, and the American Bridge Co. was the contractor.

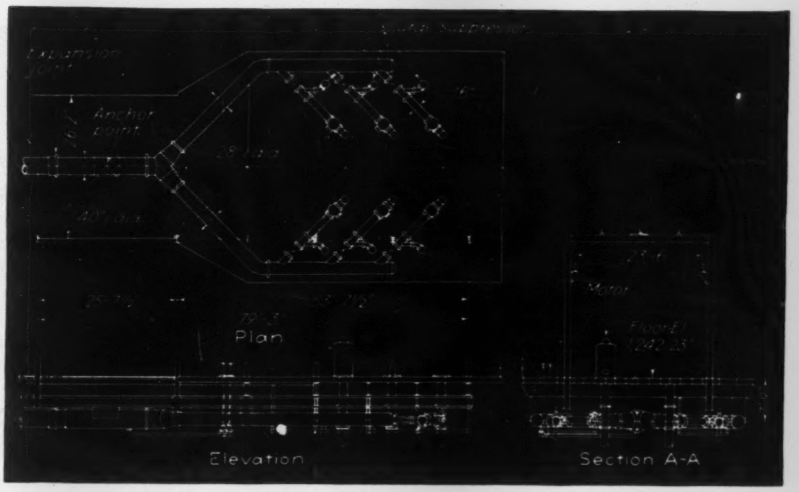


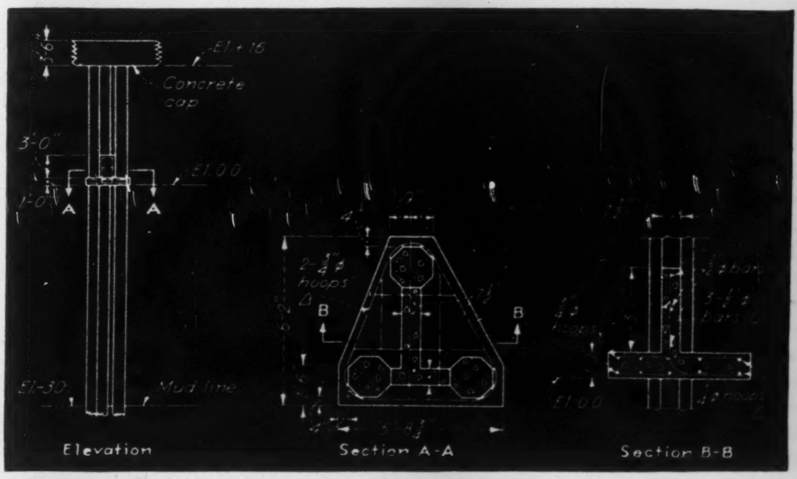
Fig. 2. Plan and elevation of pump house at outer end of the cantilever bridge.

Ties Stiffen Long Concrete Piles

In the approach to a bridge recently built in California, the supports are 18-in. octagonal concrete piles, 50 to 80 ft. long, arranged in a double row under the concrete cap of each bent. Because these piles would have had an unsupported length of 46 ft. from mud line to cap, it was decided to put in a tie or concrete diaphragm, as near to the midpoint of the unsupported length as construction above low water would permit. Sufficient stiffness to the structure would be provided, it was believed, if groups of three piles at four points in each of the bents were tied together with the stiffener.

Accordingly, after the piles had been driven and the cap poured, those that were selected for the ties were worked over with a bushhammer to roughen the surfaces where the concrete of the tie was to be applied, just above Elev. 0.0. The roughened surfaces were then cleaned, wetted thoroughly and coated with neat cement grout, after which the concrete ties were poured in forms arranged according to a design shown in the accompanying drawing.

The work was done under supervision of the California Division of Highways.



Concrete ties at low water line stiffen 46-ft. unsupported pile lengths.

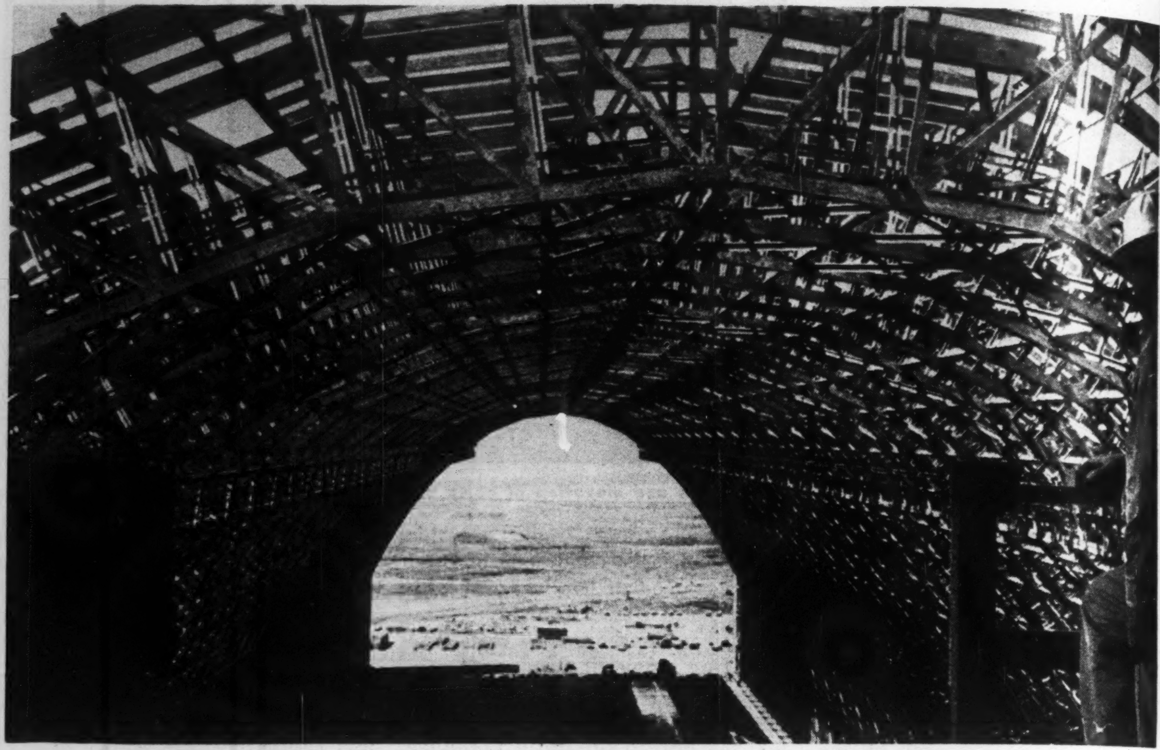


Fig. 1. This arch barrel was assembled and erected, complete to under side of sheathing, in 156 working hours.

High Speed Timber Blimp Dock Erection

***Contents in Brief**—Arch barrel of one of the Navy's large timber blimp docks, involving 1,700,000 ft. b.m., erected in 156 hours, complete with all facilities, such as monitor monocrane rails, catwalks and lighting conduits, that otherwise would have required scaffolding. Speed is ascribed to organization and teamwork of crews on a two-derrick traveler that lifted arch segments two ribs wide.*

A SPEED RECORD is claimed in erection of one of the two large timber blimp docks built for the Navy at Moffett Field where the arch barrel was completed in 17 one-shift days; actually 156 working hours. This is one of the standard timber docks of 237-ft. span, 170 ft. high and about 1,000 ft. long. The timber arrived on the job preframed. Assembly on the ground into sections of about 12-ton weight was carried on simultaneously with erection. The traveler from which the 51 arches were erected was designed to facilitate placement of the purlins, rafters and all parts of the structure that otherwise would have required falsework. These items include monorails, monitor, catwalks and even the electrical installations. Thus when the traveler moved out from under an arch there was no further need for sending workmen in among the arch members.

The erection methods to be used on about a score of these large timber docks have been left to the contractors. Methods that the contractors have chosen have differed widely in different parts of the country but at the time the Moffett Field dock was set up with the speed here noted, this record had not been equalled on any other contract. Previously published descriptions of this type of dock or the large timber arches used in them have appeared in *ENR*, Oct. 22, 1942, p. 576; March 11, 1943, p. 333; April 22, 1943, p. 542; Aug. 26, 1943, p. 320, and Sept. 23, 1943, p. 460.

The speed made on the Moffett Field dock is ascribed to the organization, the spirit of the crews and the interest of the men in establishing a record. A particularly important factor was the traveler which had been designed with a view to all erection requirements, including the placement of arch sections two ribs wide. At the height of the work, after the crews had developed teamwork, three moves of the traveler could be made in one 10-hr. shift. That is, 120 lin.ft. of the arch barrel was set up complete in one day's work.

Another factor in speed was the accuracy of the work done in preframing the timber at the mill. By reason of the fire-resistant treatment, which brought the material to the job with a relatively high moisture content, no considerable shrinkage occurred between the time of preframing at the mill and assembly of the nber into the sections on the job. us the fitting could be done quickly d accurately.

Timber was delivered to the job on ilroad tracks beside which stock- es were arranged for convenient nsfer by lumber carrier to jigs on ich the sections were assembled. ch arch went up in five sections, o on either side and a crown sec- n at the top of the arch. A crew of men at each jig worked with parts t together by others in preassembly. me 70 men working on the five jigs d their supply lines turned out a ximum of about one section per per hour.

From the jig to a point within reach the derrick boom that would place section in the arch, transportation s by means of a specially built iler with solid rubber tires ar- nged in a 14x24-ft. wheelbase.

A 700-ton traveler

The traveler design, based on pat- ts developed by the contractor in evious jobs, had a frame of great idity by reason of the sturdy units which it was constructed. These its, well braced rectangles whose incipal members were 10x10s and x12s 22 ft. long, were assembled to towers on railroad flatcars and cks grouped on railroad tracks in ch a way that a truck would come der each tower unit.

In addition to the working plat- rm at the crown of the arch, there re nine levels on either side at ights convenient for all field joints d at other locations where consider- le work had to be done. Eight-ton draulic jacks were located at two ints on the crown platform and at her points on either side lower wn where they might be con- nient.

Large derricks on the traveler

The derricks, of which there were o, one on each of the forward rners of the traveler, had 100-ft. oms and considerably more ca- city than was needed on this job. he traveler is scheduled for other rk later.) Swing leads from a -ft. bullwheel were carried down to three-part tackle at the drum on the isting engine for accurate control d ample purchase in swinging ainst the high winds that were mmon on this job.

The traveler was powered with two eam donkey engines mounted on flatcars that were part of the traveler base. With these engines the 40-ft. moves of the traveler were completed in 3 min. Despite its 700-ton weight, the traveler never required a heavy pull on the hauling lines unless moving against a head wind. In moving the traveler into position for starting erection operations it was advanced 1,000 ft. in 15 min.

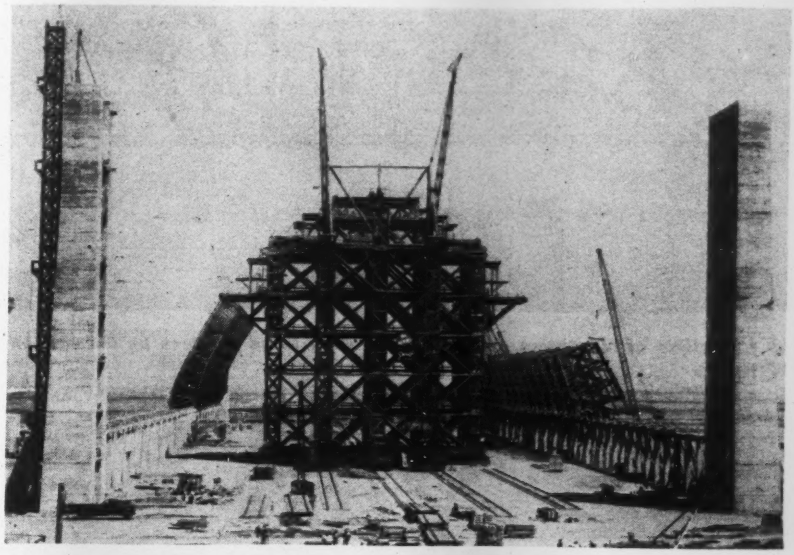


Fig. 2. Moving the traveler into place to set the upper sections of the arch. Some lower sections set by cranes working on the ground are already in place.

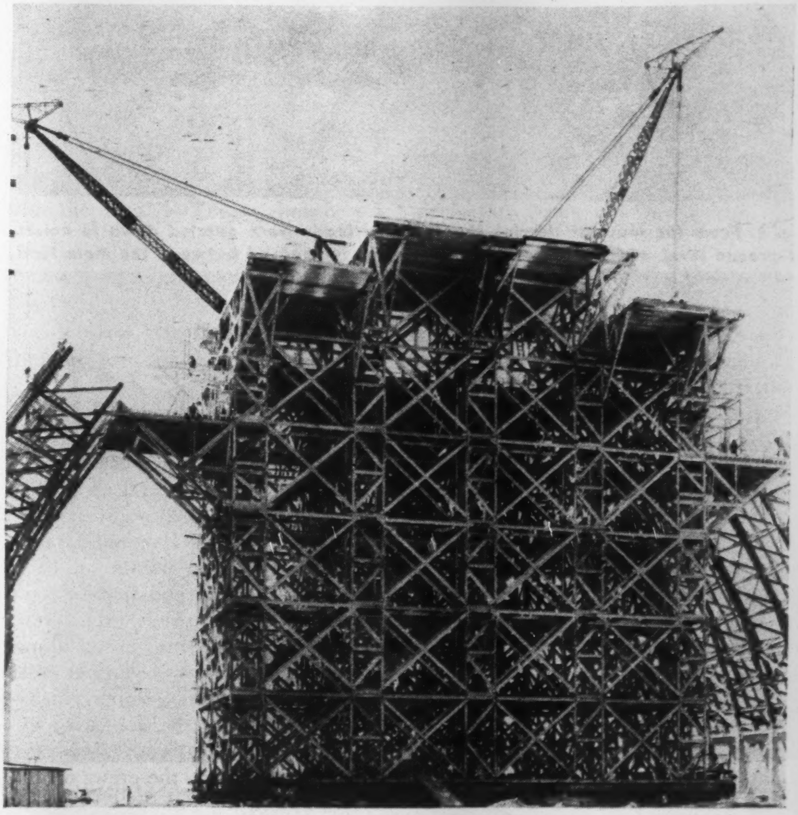


Fig. 3. The big traveler had a derrick on each side operated by hoisting units mounted on flatcars at ground level.

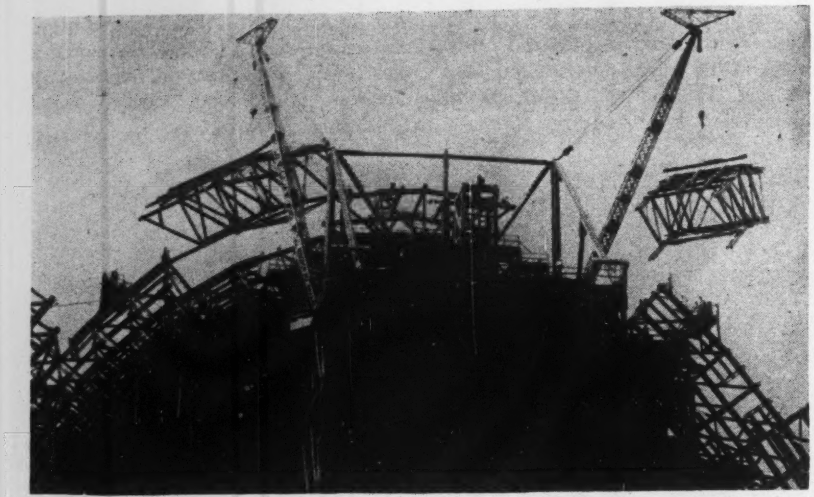


Fig. 4. Sections of the arches, two ribs wide, were lifted to place by derricks on the traveler.

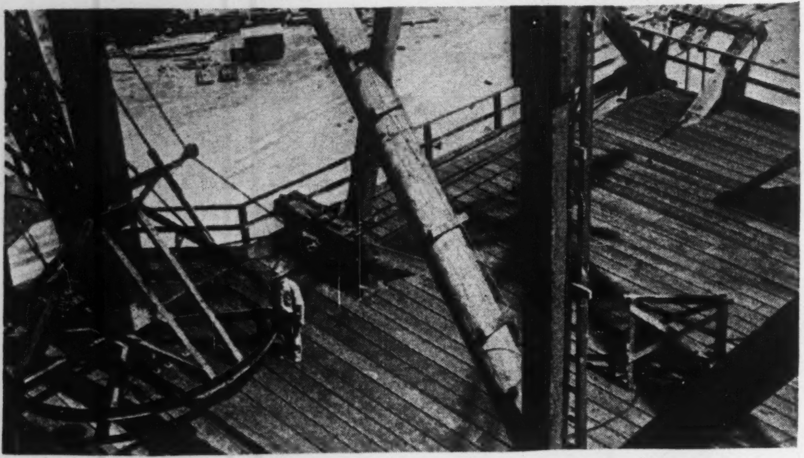


Fig. 5. From the traveler derrick the swinging leads were carried down to hoists at ground level where a three-part tackle was interposed between the main lead and the drum.

Speed in placing arch segments was increased by the use of two-way interphones between the steam engine operator and the foreman directing the placement of a section from some vantage point on the traveler. No earphones were used; amplifiers and transmitter, built into the same unit, were used at both ends. (Because this permitted two-way conversation it was frequently a convenience, when the derricks were not in service, in obtaining information or transmitting instructions between the top of the traveler and ground level.) The foreman on the traveler had enough flexible cord to allow him to move about freely on any level. To safeguard loads in transit, a green light which showed constantly at the hoist operator's station while the phone was in service, automatically was cut out if the telephone circuit was broken from any cause.

Arch erection procedure

A crew of eleven men working with each of the traveler derricks picked up and raised the arch segments and set them in place. Hydraulic jacks located at strategic points on each side of the traveler and precisely on the center line of each arch, were available for effecting exact alignment and adjustment of vertical position. However, after gaining experience the crews set the arches so exactly that the jacks were used very little. In addition to the crews on the derricks there were about 20 carpenters bolting up and 20 more on the bottom lacing.

Factors that contributed to speed erection were little items of conve ent arrangement or devices that sav time and effort. Typical of these w a hand-operated ram used for dri ing a pin (in place of a bolt) at a joints where slight disalignment the bolt holes might have caused d lay in getting the joint fastened. T pin could be driven by blows of 10-lb. spool-shaped ram which sl along an extension of the pin strike stops at either end of its trav This device could be operated rather "unhandy" positions by use a rope sling passed around the spo and pulled in such a way as to fl the weight repeatedly against the sto at one end of its throw.

The ram was also used with pil bolts whose threaded end was fitte (on specially cut threads of small diameter) with a bullet-shaped t that served to guide it through hol not exactly aligned, meanwhile pr tecting the standard threads so the would be ready for use after th special tip had been removed.

Traveler advanced 40 ft.

The traveler advanced 40 ft. each move, thus leaving a 20-ft. ga between each successive segmen placed in the arch barrel. As soon a a pair of arch ribs was set up, purlins rafters and other members to fill i the gap from the previously complete pair were placed by crews on the several working levels of the traveler using timber attached for this purpose to each segment of the arch a the time the segment was assemble in the jig. At first this material wa sent up by being toenailed to th corresponding piece in the assemble section. Later it was found mor satisfactory to fasten on the additional pieces with the aid of tie ropes which were sent back and used repeatedly.

About 60 days after completion o the first of the two docks built under this contract a crew of riggers was sent up into the arches to tighten all bolts that might have been loosened by shrinkage of the timber. There were sixteen men in this crew and about 10 days were required for going over all bolts in the structure. There was considerable take-up; on many of the bolts two turns were required to tighten the nut.

The Moffett Field docks were built for the Bureau of Yards & Docks, U. S. Navy, Rear Admiral Ben More-chief of the bureau, Rear Admiral N. C. Bruns, public works officer, n Naval District. Lieut.-Comdr. L. Mann is officer in charge of struction, E. F. Sullivan, resident ineer in charge of construction.

The general contract for construc- was held by Earl W. Heple & J. H. Pomeroy & Co., Inc., joint contractors (contract NOy5604). Key men in the contractors' organization were: C. T. Gutleben, project manager; J. R. MacDonald, general erection superintendent; C. H. Manning, general dock superintendent, and C. J. Haglund, superintendent of dock enclosure. Each of the two docks, exclusive of falsework, used about 3,500,000 b.ft. of timber, preframed at the mill. For one hangar millwork was done by the Henry Mill and Timber Co., Tacoma, Wash., and for the other by Timber Structures, Inc., Portland, Ore.

Army Experience With Sanitary Fills

__ntents in Brief__—Following an order last summer from the Chief of ineers, U. S. Army, that the sanitary fill method of refuse disposal uld be employed in lieu of incinerators to conserve critical materials, practice was initiated at many posts. Experiences in operating more n 100 landfills were outlined in a paper at the recent meeting of the erican Public Works Association, of which the following is an excerpt.

ITARY FILL WASTE DISPOSAL operons are now being conducted at army posts, and the method has n so successful that its use will be ended to 140 more posts by next ing. Economy in both manpower equipment utilization have reed from the adoption of this hod of refuse disposal, which was ered by the army authorities in e 1942 when materials shortages tailed the construction of inciner- r facilities.

xperiences in the operation of se sanitary fills were outlined be- e the recent meeting of the Ameri- Public Works Association by n L. Vincenz, chief of civilian spe- lists, Repairs and Utilities Branch the Corps of Engineers. Complete ails of the methods used by the ny were given in *Engineering ws-Record,* Dec. 17, 1942, p. 851.

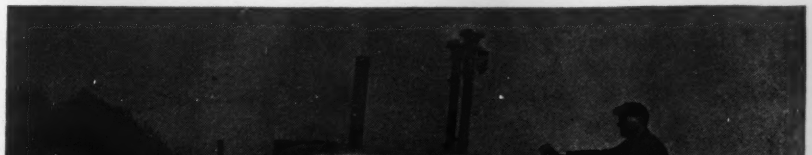
Mr. Vincenz stated that last June struction was underway on 200 fields at each of which 3,000 to 00 men would be housed. No uipment suitable to the sanitary fill rations at such a small post had n developed, but after some rching and experimenting, the ott bull-clam shovel attached to a wler type tractor was found to very satisfactory. One-hundred nty-five tractors, equipped with bull-clam shovels of 1-yd. capac- , were purchased for less than 000 each and assigned to the air- ds in lieu of the construction of dinary incinerators. They have oven, said he, to be an ideal piece equipment for camps in which the population is less than 15,000.

The bull-clam shovel is in effect an easily elevated bulldozer with a lip hydraulically opened and closed so that the dirt is gathered by bulldozing it ahead of the tractor until the bucket is filled, when the lip is closed, forming the shovel or bucket. The shovel is skidded ahead of the tractor to the top of the fill and the dirt deposited on the compacted refuse. These bull-clam shovels are made in 1-, 2- and 3-yd. sizes, requiring, of course, a progressively larger size tractor.

When the small tractor, equipped with the 1-yd. bull-clam shovel, was first issued, it looked so tiny that many of the post engineers declared it to be inadequate. Equipment of this size, however, has been operating successfully at one of the posts in Texas that houses 26,000 men. Experience with a 3-yd. bull-clam shovel mounted on an appropriate-sized tractor shows that it will do fully as good a job as a dragline. Incidentally, a dragline of three-quarter yard capacity is sufficiently large to satisfactorily handle the refuse of a post of 80,000 men.

Compaction very important

There are several points about the operation of the sanitary fill that have had to be stressed over and over at the Army posts, stated Mr. Vincenz. The first one is the importance of compaction. At practically every camp edible garbage is sold to farmers for hog feed and many other things are recovered for salvage. Of



Tractor equipped with a "bull-clam" shovel is used for sanitary fill operations at army camps of less than 15,000 population. This piece of equipment digs, lifts and transports cover materials and also performs levelling and compacting operations.

the remaining refuse, 65 to 75 percent by weight is dry. Incidentally this creates quite a problem for the incinerators, nearly all of which were designed to handle waste material of which 65 percent by weight was wet.

Another difficulty that has been experienced in the handling of refuse at army posts, both at incinerators and the sanitary fills, is the lack of proper collection equipment. The collection is handled in nearly all cases by post prisoners—enlisted men who have been guilty of some minor infraction of the regulations. The trucks generally used are the ordinary army cargo trucks. The result is that the loads are light and are unloaded by hand by men who are not in a hurry to get the job done.

The trucks arrive at the fill and back up to the trench, sometimes as many as eight in a row. It is necessary, therefore, at the smaller posts to bulldoze this refuse in the trench longitudinally into the compacted part of the previous day's fill. Compaction is obtained by driving the tractor up onto the piled refuse. As more refuse is delivered to the fill, it is further bulldozed and compacted into the smallest pile possible, both vertically and longitudinally, utilizing the full width of the trench (8 to 10 ft.)

At the larger posts it has been found necessary to have both a small tractor equipped with bulldozer to compact the refuse and a dragline, the latter to perform the covering operations. At intermediate sized posts where the job can be handled entirely by the dragline, the compacting is done by dragging the refuse with the bucket longitudinally in the trench; compaction from the top is accomplished by dropping the bucket on the refuse before starting to cover with earth.

The objective of these operations is to build a fill very much in the same manner that a fill is made for a highway—compacting the refuse in layers about 12 in. thick but remembering also to keep the refuse for the day compacted into the smallest number of square feet.

Invariably new equipment operators have the mistaken belief that their job is to move a lot of earth. This results in failure to provide proper compaction and also results in the digging of a much deeper trench than is required. When compaction is properly completed, the amount of earth to be moved is remarkably small and the total amount of square feet of new fill for the day is also very small.

At first the equipment operators are hesitant in moving the tractor out on the refuse piles, but once they are taught to drive over the pile when it is no more than 30 in. high in the bottom of the trench, thus compacting that to less than 12 in., they soon gain the needed confidence. Some of the fills have been practically ruined because of the lack of compaction before covering, with the result that when the trucks drive out on the fill to unload in wet weather, they are bogged down. Where the fills are properly operated, no trouble is being experienced even in the regions of very heavy rainfall.

Some case histories

Excerpts from official reports were cited by Mr. Vincenz, as follows:

At one post housing about 90,000 men, it was necessary to fill an area of about 20 acres an average of four to five feet deep to provide a training ground. Estimated cost of the approved project was $164,000. The idea was conceived of adopting the sanitary fill method so as to include the 150 truck loads per day of refuse and thus speed the fill operations.

This resulted in a much earlier completion of the project at only a fraction of the originally estimated cost, closed down the incinerator releasing the 15 men employed there, requiring only 4 men at the fill with a three-quarter yard dragline and a tractor equipped with bulldozer. The cost of $1,700 per month for operating the incinerator became $638 per month for operating the sanitary fill.

At another post waste material was being compacted daily over a large area of the trench instead of being confined to one end. Only a light covering of two or three inches of dirt was being placed on the material. This was a small fill and the operation was completely changed in a few hours and the correct methods of operation demonstration. There is a very high groundwater level and the demonstration proved that a fill can be operated successfully where such conditions exist.

From one of the larger posts it was reported that two standard 10-ton incinerators had been provided and until just recently had been operating, employing five civilians and using
eight soldiers. A dragline was
obtained and the necessary tr
and ramp constructed for the op
tion of a sanitary fill. There were
truck loads of waste material
posed of the first day and a very s
factory fill is in operation. This
which utilizes one equipment o
ator and one additional man, is
posing of all refuse.

Countrywide applications

Present army landfill operatio
reported Mr. Vincenz, extend fr
Massachusetts to Florida and fr
the east to the west coasts. Altho
its use at the far north posts is
mandatory, one of the post engine
in Michigan insists that he can m
it work all through the winter.
greatest use of the sanitary fill is
the southern states.

Mr. Vincenz concluded with
hope that one of the beneficial resu
of this war will be to bring to sm
cities and communities a better app
ciation of the value of proper sani
tion and a knowledge of practic
inexpensive methods of achievi
that objective in waste disposal me
ods. The army of the United Stat
he said, is helping to point the way
a better day in refuse disposal me
ods.

Germicidal properties o chlorine vs. chloramines

During the last war, the use
ammonia with chlorine to form chl
amine, which was reputed to be mo
efficient, was introduced with a vi
of conserving chlorine. Recent e
perimental work in this connecti
was reported to the American Publ
Health Association by Lt. Col. M
Levine and Capt. George R. Webe
Sanitary Corps. Their findings ind
cate that:

In the treatment of highly alkali
waters (reactions more alkaline tha
pH 9.4) the use of chloramine woul
effect a saving, but that for neutral
only moderately alkaline waters, co
servation of this critical elemen
would be better achieved by the us
of free chlorine as a germicid
Furthermore, for every 10 deg.
rise in temperature, the concentratio
of chlorine may be reduced to ha
and that of chloramine to a quarte
(a saving of 50 percent and 75 pe
cent, respectively) and still obtain th
same germicidal effect.

ostwar Construction Planning Activity

Nov. 4, *Engineering News-Record* ounced that proposed postwar jects reported during the first nine nths of 1943 had reached a volume $3,476,987,000, an average for the ited States of $26 per capita.

The leading states to date in rolling this total are:

chigan, $746,868,000, or $142 per capita

w York, $655,411,000, or $49 per capita

lifornia, $478,015,000, or $69 per capita

xas, $310,965,000, or $49 per capita

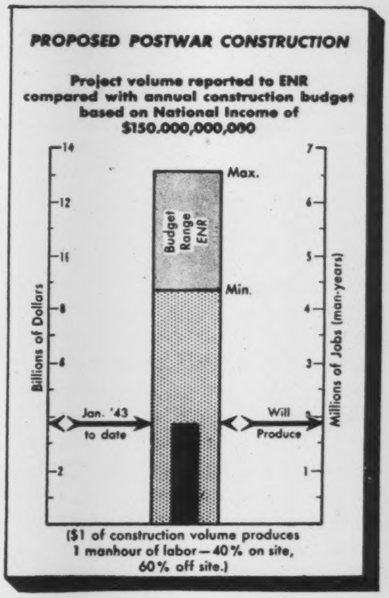
ssouri, $218,213,000, or $58 per capita

The kinds of projects reported from each state so far are shown in the accompanying table.

State and municipal work leads with $2,864,224,000, federal follows with $418,569,000, and private proposed postwar construction, identified as announced projects, trails with $194,194,000.

These figures are based on the individual projects reported to *Engineering News-Record* from January, 1943 through September, and published in the Postwar Projects columns immediately preceding the Construction Reports section.

This analysis of what kinds of work are proposed and where they are being planned will be issued quarterly. The next table will cover the full year 1943.



PROPOSED POSTWAR CONSTRUCTION

Project volume reported to ENR compared with annual construction budget based on National Income of $150,000,000,000

($1 of construction volume produces 1 manhour of labor—40% on site, 60% off site.)

PROPOSED POSTWAR CONSTRUCTION PROJECTS — UNITED STATES AND CANADA

(First Nine Months, 1943) As Reported to Engineering News-Record (Thousands of Dollars)

PUBLIC WORKS CONTRACTS								PRIVATE CONTRACTS				CONSTRUCTION		ENGR. CONST. TOTAL Thous. $	$ PER CAPITA (1940 Census)	STATES
Waterworks	Sewerage	Bridges	Earthwork, Drain.	Streets and Roads	Buildings	Unclassified	Federal Gov't. Work	Bridges	Indus. Bldg.	Com. Bldg.	Unclassified	Private	Public			
	707	55		605	990	45			40	150		190	2,402	2,592	3.1	Me.
15	50				1,213		150						1,278	1,278	2.6	N. H.
			30,000		525		30,000						30,525	30,525	85.0	Vt.
2,820		190	13,555	800	5,792	4,913	13,500		80	350		430	28,070	28,500	6.6	Mass.
55	390		131	150	6,895	3,354	74			150		150	10,975	11,125	1.6	R. I.
	3,842	80		2,500	11,615	150	75		90	1,500	100	1,690	18,187	19,877	11.6	Conn.
2,890	**4,989**	**325**	**43,686**	**4,055**	**27,030**	**8,462**	**43,799**		**210**	**2,150**	**100**	**2,460**	**91,437**	**93,897**	**11.1**	**N. Eng.**
1,177	88,092	14,055	11,455	59,031	301,394	128,057	10,000		2,000	50,150		52,150	603,261	655,411	48.7	N. Y.
	100				1,000	1,334					475	475	2,434	2,909	0.7	N. J.
3,600	1,400		95,015	7,110	875	40	95,000			212		212	108,040	108,252	10.9	Pa.
			10,000				10,000		100			100	10,000	10,100	5.5	Md.
			15	50	10,433	100	2,140						10,598	10,598	16.0	D. C.
		25											25	25	0.1	Del.
4,777	**89,592**	**14,080**	**116,485**	**66,191**	**313,702**	**129,531**	**117,140**		**2,100**	**50,362**	**475**	**52,937**	**734,358**	**787,295**	**26.0**	**Mid. Atl.**
		18,121		14,000									32,121	32,121	12.0	Va.
			19,500				19,500						19,500	19,500	10.2	W. Va.
695	2,080	2,309	879	2,701	1,848	1,255				4,150		4,150	11,767	15,917	4.5	N. C.
960				600					400			400	1,560	1,960	1.0	S. C.
																Ga.
304	5,908	5,091		3,700	1,962	3,907				1,000		1,000	20,872	21,872	11.5	Fla.
																Ala.
		13			150								163	163	0.1	Miss.
		500											500	500	0.2	La.
					400								400	400	0.1	Ky.
	18,656		1,758	2,150	56,542	4,696			40	1,000		1,040	83,802	84,842	29.1	Tenn.
1,959	**26,644**	**26,034**	**22,137**	**23,151**	**60,902**	**9,858**	**19,500**		**440**	**6,150**		**6,590**	**170,685**	**177,275**	**6.3**	**South.**
1,594	36,723	38,011	19,000	1,560	48,005	35,455	19,000		70	700		770	180,348	181,118	26.2	Ohio
	9,666	14,161	17,840	14,820	3,900	8,137	150		2,500	1,700	2,075	6,275	68,524	74,799	21.8	Ind.
	1,000	25	19,000	1,500	1,975	225	19,000			675		675	23,725	24,400	3.1	Ill.
315	610	4,419	49	559	3,982	1,563			830	200		1,030	11,497	12,527	4.0	Wis.
21,080	15,386	58,375		105,474	333,691	212,462	3,549			400		400	746,468	746,868	142.0	Mich.
22,989	**63,385**	**114,991**	**55,889**	**123,913**	**391,553**	**257,842**	**41,699**		**3,400**	**3,675**	**2,075**	**9,150**	**1,030,562**	**1,039,712**	**39.0**	**Mid. W.**
373	2,874	930		8,511	10,246	29,089			1,000	5,650		7,150	52,023	59,173	21.2	Minn.
110	4,438	3,859	95	600	2,275	290			40	413	75	528	11,667	12,195	4.8	Iowa
15,296	8,692	17,496	10,050	77,804	52,567	27,778	30,000		890	7,640		8,530	209,683	218,213	57.7	Mo.
140	80	371	115	1,044	3,793	50	15			300		300	5,593	5,893	3.0	Ark.
125	240	30	1,630		200	420							2,645	2,645	4.1	N. D.
1,395	744	80	232		445	113				250		250	3,009	3,259	5.1	S. D.
358	632		10,650	20,000	2,665	10,344	9,000		40			40	44,649	44,689	34.0	Neb.
50			9,000				9,000						9,050	9,050	5.0	Kan.
1,975		300			150	25,000	300						27,475	27,425	11.8	Okla.
2,201	5,889	17,105	130,055	96,231	7,445	17,605	105,443		3,359	29,100	1,975	34,434	276,531	310,965	48.5	Tex.
	2,183			18,000									20,183	20,183	36.1	Mont.
45	200												245	245	1.0	Wyo.
									1,500	150		1,650		1,650	1.5	Colo.
																N. M.
22,068	**25,972**	**40,171**	**161,827**	**222,190**	**79,786**	**110,689**	**153,758**		**7,329**	**43,503**	**2,050**	**52,882**	**662,703**	**715,855**	**26.8**	**W. of Miss.**
			15,100				15,100						15,100	15,100	28.8	Idaho
30	322												352	352	0.6	Utah
																Ariz.
				25,902	635								26,537	26,537	241.2	Nev.
8,388	6,770	15,157	16,443	77,250	1,920	2,853	15,885			150		150	128,781	128,931	74.2	Wash.
55	360	300	12,238	100	1,210		11,688				25	25	14,263	14,288	13.1	Ore.
66,375	24,719	652		257,381	42,075	16,813					70,000	70,000	408,015	478,015	69.0	Calif.
74,848	**32,171**	**16,109**	**43,781**	**360,633**	**45,840**	**19,666**	**42,673**			**150**	**70,025**	**70,175**	**593,048**	**663,223**	**58.1**	**Far W.**
129,531	**242,753**	**211,710**	**443,805**	**800,133**	**918,813**	**536,048**	**418,569**		**13,479**	**105,990**	**74,725**	**194,194**	**3,282,793**	**3,476,987**	**26.4**	**Total U. S.**
24,598	**19,467**	**105,465**	**175,540**	**185,277**	**45,396**	**44,752**			**2,935**	**2,425**		**5,360**	**600,495**	**605,855**	**53.1**	**Canada**

From Field and Office

WORKING PROBLEMS AND TIME-SAVING METHODS FOR ENGINEERS AND CONTRACTO

Resistance Capacity of Anchors or Deadmen

Resistance capacity of anchors or deadmen in new or old masonry, natural rock, earth or homogeneous backfills, may be determined quickly by the curves in the accompanying drawing. The author has used the graph for many years, and believes it to be accurate or at least closely approximate. The figures in the graph show the failure as forming the frustum of a cone or pyramid, generally correct for masonry and rock.

One assumption used in development of the curves is that the reaction must clear (be applied outside the limits of) the frustum or bowl displaced, or tending to be displaced; another is that the anchor is normal or nearly normal to the surface. The mathematical derivation of the curves is omitted for lack of space.

Use of the graph, which does not take into account of weight of displaced material, permits rapid determination of the resistance capacity of anchors by solving the formulas.

$$P = \frac{8Sd^2\left(\frac{b}{d} + \tan\alpha\right)}{\sin 2\alpha} \text{ (for square plate)}$$

and

$$P = \frac{2\pi Sd^2\left(\frac{b}{d} + \tan\alpha\right)}{\sin 2\alpha} \text{ (for round plate)}$$

In these formulas $P =$ resistance capacity of anchor; $S =$ average working unit shear on the surface of failure; b and d are the dimensions of the anchor plate; and angle α, which varies with ratio of b and d, shows slope of plane of failure. Units used must be consistent in any computation.

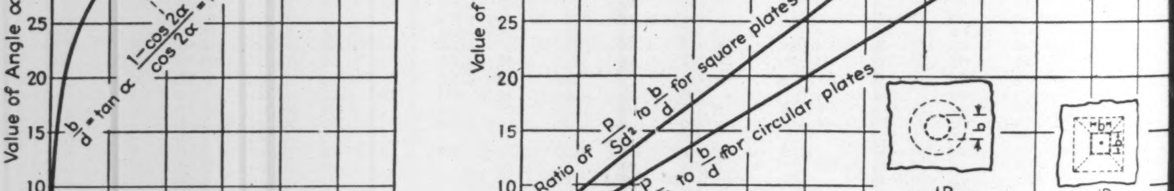
The expression "total shear", S in the formulas, refers to average unit shear. Due to the compressibility of the material, partial initial failure occurs on the plane of cleavage at the region of the anchor plate, and the resistance here is then lessened. Since the *entire* sloping surface of the frustum or bowl has been assumed, a not-too-punishing average value for S should be used as the basis of calculation.

To use the curves and formulas, assume b and d; find the value angle α from the $\frac{b}{d}$ curve; check wi the $\frac{P}{Sd^2}$ curves to see that the valu do not exceed the limits set by the curves. If satisfactory, determine t holding power for the plates by t formulas.

For deep anchorage in earth would be better to assume a bo shaped rupture so that an avera value of α should be taken; and he the weight of the displaced materi should be added to value of P dete mined by the above formulas.

Proof of a bowl shaped failure varying) in large displacements granular materials, i.e., where t mass is great and the plane of failu is a paraboloid, is afforded by a vo canic eruption.

The b/d curve shows an interestin feature of anchors, that is, where t embedded plate is small or absen failure will occur by shear along t surface of the tension member of t anchor. Hence the curves do n apply to relatively shallow comme



Evaluation of the holding power of embedded anchor plates, either round or square, can quickly be determined by abov graphs and formulas. Left graph shows variation of angle α with the ratio of b to d to produce maximum shear. Variatio of ratio $\frac{P}{Sd^2}$ with ratio of b to d is shown by curves at right. Curves omit the weight of the displaced materia

anchors such as grout-and-lead- ol; lag-screw and machine-bolt elds of malleable iron; lead ma- ne-screw expansion-anchors; lead ered anchor bolt; and (if very llow) helical screw-anchors of a t-in-place type.

he formulas will not apply to th containing mud, nor to any terial which will immediately close on the hole produced—VIRGIL A. ERLY, *Department of Highways, lumbus, Ohio.*

OPE MAKES MUDDY STEPS SAFE

quent rains made the steps lead- to a rock crusher operated by the S. Engineers at San Ramon, Costa ca, for the Inter-American Highway rk slippery and unsafe. Under the pervision of C. N. Wilzcek, resident gineer, a short length of ¾-in. rope s nailed to the front edge of each p as shown. The safeguard proved ry effective.

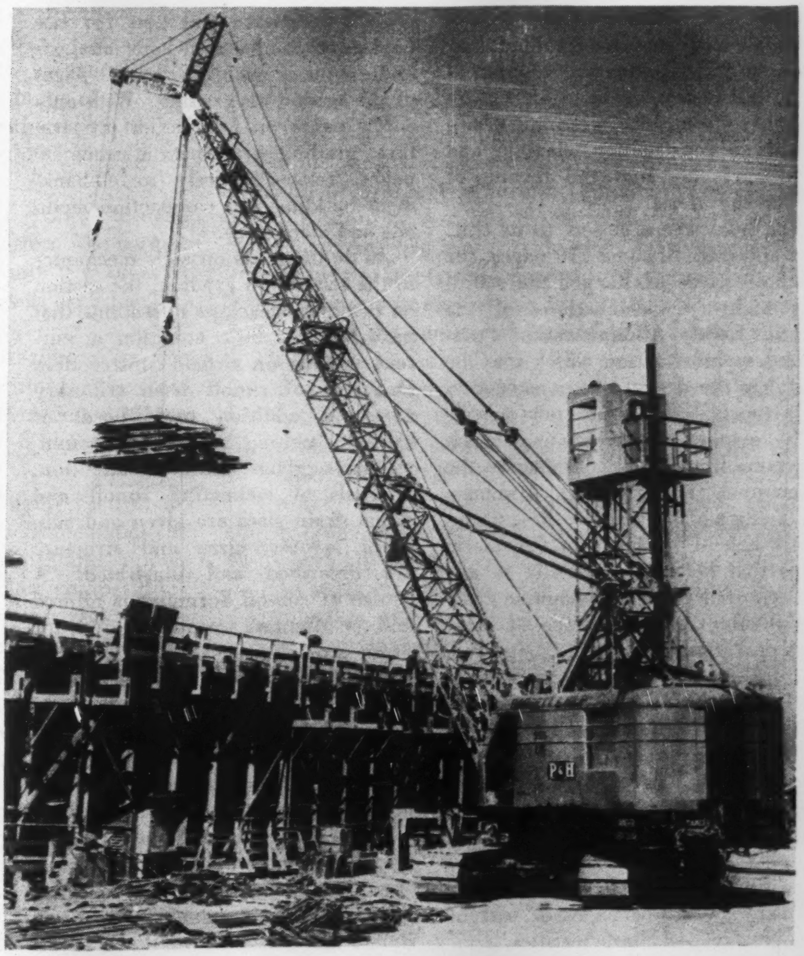
nd Ram Pulls Bolts

Withdrawing long bolts with the aid of a hand-operated ram.

A tool devised for speed and con- nience in withdrawing long bolts om heavy timber construction con- sts of a spool-shaped piece of metal eighing about 10 lb. arranged to ide on a $\frac{3}{4}$-in. bolt between stops out 2 ft. apart. A claw at one end first fitted over the head of the lt to be withdrawn and then the m is slid along the pin until it rikes the stop.

The tool can be used for driving well as for withdrawing, by reversing the direction of spool movement. A rope sling passed around the spool is sometimes used to flip the weight when the tool is to be operated in a position not within convenient reach. The device was developed by the construction organization of J. H. POMEROY & CO., INC., San Francisco.

HIGH CAB FOR SHIPYARD CRANE



The elevated cab on traveler cranes, which came into vogue for unloading coal barges on the Great Lakes, recently has been adapted to heavy construction operations. As here shown in operation in a shipyard, the rig can substitute for much of the work usually done by the high gantries that are now so difficult to get.

Book Notes and Reviews

The month's addition to the engineer's reading and reference list

✓ Airport Runway Design

Principles of Highway Construction as Applied to Airports, Flight Strips and Other Landing Areas for Aircraft—By the Public Roads Administration. $1 from the Superintendent of Documents, Washington, D. C.

Airport runways are essentially surfaced roads built for special loadings and traffic movements. Road design principles and construction methods apply in large measure to runway design and construction. It is on this premise that the soils experts and the design engineers of the Public Roads Administration have compiled this volume. In six sections and an extended appendix it gives all that surfaced roadbuilding research and experience is thought to offer that is applicable to airport location, soils physics, grading, drainage, base construction, flexible and rigid surfacing and the turfing of off-runway areas.

The book keeps closely to its title. The appendix of some 170 pages, for example, gives unchanged the standard highway specifications of the Public Roads Administration "presented as information which may be useful in the design and construction of airports." They are not specifically airport specifications. Much the same limitations characterize the discussions on grading, drainage, surfacing and turfing, but these necessarily extend farther into considerations that belong specifically to airport construction. For example grading involves considerations of large area operations outside the strip grading for runway surfacing. This to an even greater degree is true of the discussion of drainage and turfing.

The volume opens to a short section, about ten pages, on selection of site. Tabulations of classes of airports, effect of altitude on runway length and working days and climatic conditions in the several states are followed by a few pages of text on topography, soil characteristics, available construction materials and types of surfacing. Not being essentially a part of the subject of the volume this section is definitely sketchy in character. The real service of the book begins with the section on grading.

As presented, grading information is divided into two parts: (1) Soils surveys, classification, sampling and testing and (2) construction methods, with the stress laid on embarkment construction. In both parts all apparatus and equipment used and its operation are illustrated and described. The discussion on soils merits particular emphasis. The vital factor of soils physics has found too scant recognition in most current articles and papers on airport construction. Including the part on soils-control procedure and tests for embankment compaction, soils analysis and synthesis occupy some 90 pages of the section on grading. With only a few pages on foundation preparation, grading construction, some 30 pages, relates entirely to embankment building and compaction methods and machinery.

As do the parts on soils mechanics in the section on grading, the section on drainage develops operations that have had too little attention in current writings on airfield construction. Drainage of runoff from tributary areas in addition to disposal of rainfall, melting snow and groundwater is given deserved attention. Methods of estimating runoff and storm drain sizes are given and subdrain layouts, sizes and structure are described and illustrated. A choice of run-off formulas is offered and the Manning formula is given for drain sizes.

Although the two sections on flexible bases and surfaces and on rigid surfaces for runways account for about half the contents of the volume, aside from the appendix, they add less that is new in published information for airport builders than do the sections on grading and drainage. This is not saying that each is not an excellent manual on runway design and construction. Each is just that. Each covers design, materials preparation and control, construction methods and equipment, inspection and testing. It is certain that dispute will wax over some of the materia and construction requirements bu the builder who adheres to them wi not fail of a good job.

Little need be said of the sectio on turfing except that it presents th best in grass growths, planting an culture that experience in roadsid planting has to offer. Of the volum as a whole it can be said: It is not well rounded treatise on airfields, no does it pretend to be, but it is so fa the best manual on airfield construction now generally available to engineers.—*Reviewed by* Charles S Hill, *Associate Editor, Engineerin News-Record (Retired)*.

Miscellaneous Notes on Booklets and Reprints

Foundation Studies in New Orleans made by the Works Projects Administration in 1937 and reported in a book entitled "Some Data in Regard to Foundations in New Orleans & Vicinity" have been supplemented by an Addendum, copies of which may be obtained by those having the original report from DeWitt L. Pyburn, Department of Public Works, Baton Rouge, La.

Surf and Beach Pollution caused by the sewage discharged into the ocean at Hyperion, Calif., is summarized in a "Report on a Pollution Survey of Santa Monica Bay Beaches in 1942" which has recently been issued by the Bureau of Sanitary Engineering, California State Board of Health, Sacramento. Included are pictures, data on analyses and numerous charts.

A Postwar Highway Program is outlined in "A Sound Plan for Postwar Roads and Jobs", published by the American Road Builders' Association, International Bldg., Washington, 4, D. C. The 64 pp. pamphlet is a revision and amplification of a pamphlet published originally in February of this year in multigraph form. The association estimates that national income in the postwar period will be at a level calling for construction expenditures from $12 billion to $15 billion a year, of which $3 billion should be spent on roads and streets. Copies of the pamphlet may be obtained on application.

Free Enterprise

THE OPPORTUNITY AND OBLIGATION TO COMPETE

E can be prosperous beyond our dreams—all of us—workers, farmers, and business men—but one the prerequisites is the self-discipline of accepting npetition for ourselves as well as others.

* * *

ree enterprise does not imply the freedom to use or all means to make a profit. It does not mean the ht to monopolize. ***It means the opportunity and igation to compete.***

ompetition requires ***independence of action, free ess to the market,*** and ***no large degree of control r the price*** by any buyer or seller. In general, the er the number of sellers and the more easily buy-can shift from one seller to another, the higher l be the degree of competition (and vice versa for ers).

ut let us not get too academic or go off the deep d. We cannot have perfect competition. We cannot divide businesses and labor unions into tiny units to ke a multitude of buyers and sellers in each market; cannot reduce our rich variety of products to a few idly standardized items; we cannot educate people judge quality precisely; we cannot eliminate the costs bridging space between buyers and sellers. On the er hand, have we gone as far as is practical and irable in these directions?

We cannot even have a system of highly "sensitive" es, that is, prices which fluctuate immediately in ponse to every minor change in demand and supply. s would occur in the dream world of competition-the-nth-degree. It cannot occur in the real world, even in the ideal world of competition best suited physical facts and human qualities. The economies large-scale enterprise, the need for adapting products human wants, the costs of transportation and the ts of issuing and acquiring market information put ere limits on price sensitivity.

Economists tell us that if prices were extremely sen-ive, business booms and depressions would be much s severe—provided our stock of money remained rly constant. But with the somewhat limited degree sensitivity which is practicable in the economy, price l wage changes cannot prevent severe declines in business activity. ***We cannot count on competition alone to cure depressions.*** We must look mainly to other kinds of measures to prevent mass unemployment of men and machines.

If we cannot have prices which fluctuate with every small change in demand and supply conditions, we can work toward—and achieve, if we really want it—a system in which prices and wages are at least roughly responsive to long-run changes in demand and supply, a system in which most markets are not dominated by individual businesses, groups of businesses, labor unions, or farm organizations, and in which prices and wages are maintained at levels consistent with free access to markets and to jobs.

In any kind of an economic system there must be some means of determining prices, wages, and profits, and of bringing labor and capital into employment in the industry and place where they are most needed. There are two ways to do this: by administrative fiat or by the impersonal processes of the market. The first of these is typical of the totalitarian state; it frequently involves destruction of individual freedom or fumbling mismanagement. During the war all of us have had some experience with patronizing and paternalistic treatment by the state; we have found out what it means to be pushed around by bureaucrats; and we have discovered that the political determination of prices, wages, and profits leads to chaos when self-interest supersedes the fine fever of patriotism—as it eventually does. I do not mean to imply that we can do without controls over prices, production, and distribution in time of war; but I do suggest that we can learn something from their operation. Even with a united national purpose these controls work badly when human abilities are inadequate for the superhuman task, when personal or departmental jealousies crop up among officials, and when pressure groups try to prey on the rest of the public. Every day more Americans are beginning to understand why our forefathers feared the caprice and tyranny of power.

The impersonal processes of the market in determining prices and wages and in allocating productive resources will, in normal times, save us from the fumbling of bureaucrats and from the Babel of confusion, uncertainty, and annoyance produced by their regulations. But these market processes will not save us from paying toll to those who monopolize and restrict entry to markets or jobs.

If we want an economy in which we are free to try out new ideas, develop new products, and introduce more efficient methods of production, if we want an economy in which there are great opportunities for men of imagination, inventiveness and energy, if we want an economy wide open to progress, then we must have a free field and fair competition for all comers—without collusion as to prices, markets, or production. This is the only basis on which we have a right to demand freedom from governmental regulation for ourselves and on which we can combat monopolistic tendencies in other quarters.

Let us stand squarely for the principles of the anti-trust laws and against all collusion and combination in restraint of trade. Let us insist that the government review with a critical eye every combination and consolidation which might restrict competition. Let us face frankly the problems of economic power arising out of price leadership and encourage every honest effort to find means to deal with them. Let us not shrink from questions as to whether some great aggregations of plants are too large for efficiency, free entry into the industry, and a free price. While we resist the efforts of the Department of Justice to extend the anti-trust laws by far-fetched and distorted interpretation, and while we fight every attempt to use them as a tool of persecution, let us cooperate in sincere efforts to modernize these laws and extend them by specific legislation to monopolistic practices they cannot now reach. I do not have a simple formula for this, but I believe we must try to find one.

We can then, better face the problem of the growing monopoly in labor which is threatening to make the free enterprise system unworkable. Today labor is going through a stage of empire building reminiscent in some ways of a similar stage in business three-quarters of a century ago. Witness the same buccaneering spirit, the same concentration on selfish interests, and the same disregard for the public welfare. Business leaders learned the hard way that the public will eventually rise up against those who prey upon them. Will our labor leaders be wiser? The right to collective bargaining to protect the weak position of the individual employee is one thing—but the grant of unlimited monopoly privilege to combine into a private government which can dictate its own terms to businesses, industries, communities, and even to the government itself, and which can start a wage-price spiral such as to hinder the war effort and make full prosperity impossible in tim
peace is something quite different. We need to fi
middle way which will prevent employers from exp
ing employees but which does not sow the drag
teeth. The exercise of arbitrary power by labor threa
not only business, but also all workers outside
unions and all those dependent on pensions and
ings for their existence, and ultimately, of course,
well being of union workers themselves.

The idea that the labor problem can be solve
great, powerful organizations of employers will sit d
with great, powerful organizations of labor is a d
sion. If our experience in the N.R.A. and in the
teaches us anything, it is that the best that can
expected in the long run from such a situation is
armed truce with intermittent civil war. And e
truce would be a monopolistic arrangement to t
advantage of those not members of the great organi
groups. Business and labor unions, whenever confron
with postwar readjustments that are unfavorable
them will be sorely tempted to protect their o
special interests at the expense of the public. Th
will be efforts on the part of businesses, abetted by la
unions, to limit productive capacity, to raise tariffs,
obtain subsidies, and to maintain prices at artifici
high levels. The unions will oppose labor saving chan
and will seek higher wages even in areas and indust
of surplus labor. Already demands are emerging
direct joint action by business, labor, and agricult
to solve the transition problems of special concern
them. While these groups should have every opp
tunity to register their own self-interest, we cann
entrust our fate to decisions made by pressure grou
If experience is any guide, such coalitions will be alm
certain to restrict opportunities for progress and
pansion, to exploit the public, and ultimately to inj
even the businesses, workers, and farmers included
them. We cannot afford a postwar N.R.A. Resort
temporary government regulation in the transition fro
war to peace may, however, be necessary in cases
great hardship.

We can be prosperous beyond our dreams—all of
—workers, farmers, and business men—but one of t
prerequisites is the self-discipline of accepting co
petition for ourselves as well as others.

James H. McGraw, J

President, McGraw-Hill Publishing Company, In

Exide-Ironclad Batteries

power *when* it's needed, *where* it's needed . . .

It takes plenty of power to deliver coal, minerals, and ores from America's mines and open-cut operations. That power must come from a dependable source, must flow out constantly when it's needed . . . and where it's needed.

Exide-Ironclad Batteries, one of the most compact and efficient sources of electric current ever devised by man, provide this efficient and dependable source of power in mines all over the country. Exide-Ironclads are noted for long life under the most severe conditions. Their ease of maintenance and complete dependability mean savings in labor and equipment costs.

Every Exide is ruggedly built to take a beating and to come up smiling. When you buy an Exide you *Buy to Last*. Take care of it and *Save to Win*.

THESE RULES PROTECT YOUR STORAGE BATTERIES:

1. **Keep adding approved water at regular intervals. Most local water is safe. Ask us if yours is safe.**
2. **Keep the top of the battery and battery container clean and dry at all times. This will assure maximum protection of the inner parts.**
3. **Keep the battery fully charged—but avoid excessive over-charge. A storage battery will last longer when charged at its proper voltage.**
4. **Record water additions, voltage, and gravity readings. Don't trust your memory. Write down a complete record of your battery's life history. Compare readings.**

If you wish more detailed information, or have a special battery maintenance problem, don't hesitate to write to Exide. We want you to get the long-life built into every Exide Battery. Ask for booklet Form 1982.

DELIVERIES: Despite war-time conditions, we are quite sure we can make deliveries to meet your requirements.

Exide
IRONCLAD
BUY TO LAST
SAVE TO WIN

ARMY E NAVY

Exide
IRONCLAD
BATTERIES

THE ELECTRIC STORAGE BATTERY CO., Philadelphia 32
Exide Batteries of Canada, Limited, Toronto

MATERIALS AND LABOR PRICES

Market quotations on construction materials and wage rates reported monthly by ENR correspondents

CONSTRUCTION MATERIAL prices for December reveal only minor changes from a month ago in the twenty cities reporting to *Engineering News Record*.

Short-leaf yellow pine is $2.50 to $4.00 per M ft., board measure, higher in Dallas; and rough long-leaf yellow pine timber is mixed there, up $5.50 on the 2x12-in. size, and off $2.50 on the 12x12-in. size.

Portland cement is up 20c. per barrel in Los Angeles. Sand and gravel are lower in Detroit. Ready mixed concrete is up 50c. in Detroit, and is 25c. higher in Minneapolis due to a heating charge. Paving asphalt in drums is $4.00 per ton higher in Seattle.

Brick is $1.00 per M lower in Kansas City on both the common clay and the straight hard. Roofing supplies are up 15c. on slate-surfaced rolls, and up 9c. on asphalt felt and tar felt in Detroit.

Skilled and common construction labor rates are unchanged from a month ago in all of the twenty cities.

CEMENT, AGGREGATES, READY-MIXED CONCRETE—F. O. B. CITY

	PORTLAND CEMENT Per bbl., C/L lots, incl. 40c. per bbl. for bags, cash dis. not deducted			SAND AND GRAVEL Per ton, carload lots			CRUSHED STONE Per ton, carload lots		CRUSHED SLAG Per ton, carload lots, f.o.b. plant		CONCRETE BLOCK 8x8x16-in.; truckload del.; per block		CONCRET Ready Mixed 1:2:4, over 50 c.y., del
	Cloth *a*	Paper	Bulk	Gravel, 1½ in.	Gravel ¾ in.	Sand	1½ in.	¾ in.	1½ in.	¾ in.	Sand-grav.	Lt. wgt. Agg.	
Atlanta	$2.77	$2.52	$2.47	$1.79	$1.89	$1.99	$1.79	$1.89	$1.59	$1.69	$0.17	....	$8.00
Baltimore	2.33	2.08	1.88	1.75‡	1.75‡	1.25‡	1.75‡	1.75‡	1.75‡	1.75‡	.125	$0.125*w*	7.25
Birmingham	2.50	2.25	2.10	1.75	1.75	1.50	.85	1.00	.90	1.15	.1425	....	5.80
Boston	2.75*b*	2.40*b*	2.30	1.40‡	1.40‡	1.00‡	1.40‡	1.40‡	....	....	.135	.135*w*	7.25*m*
Chicago	2.70	2.45	2.30	2.15‡*d*	2.15‡*d*	2.15‡*d*	2.15‡*d*	2.15‡*d*	1.75‡	1.75‡	.16	.16*x*	....
Cincinnati	2.31	2.06	1.81	1.20	1.20	1.10	1.80	1.80	....	....	.12	.15*w*	6.60
Cleveland	2.40	2.15	....	1.70*i*	1.70*i*	1.60*i*	1.70*i*	1.70*i*	1.75*i*	1.75*i*	.14	.14	7.30*i*
Dallas	2.52	2.27	2.07	1.50*p*	1.70*p*	1.10*p*	1.69*p*	1.79*p*	....	....	.15	....	6.20
Denver	3.08	2.88	2.32	1.20	1.30	1.25	1.65	1.75	1.00	1.00	.15	.15*w*	7.25
Detroit	2.39	2.14	1.99	1.50	1.50	1.50	2.25	2.25	2.00‡	2.00‡	.16	.16*w*	7.00
Kansas City	2.58	2.33	2.18	1.85	2.30	1.00	1.91	1.91	....	....	.125	.125*wy*	7.50*n*
Los Angeles	3.00*v*	2.40*v*	....	1.30	1.30	1.15	1.30*f*	1.30*f*	....	....	.04*bb*	.10*aa*	7.25
Minneapolis	2.90	2.65	....	1.00*h*	1.00*h*	.25*h*	1.00*h*	1.00*h*	....	....	.12	.16	7.60*j*
Montreal	....	1.95*r*	1.79*r*	....	1.65‡*t*	2.05‡*t*	1.05‡*t*	1.15‡*t*	....	....	.14*c*	.14*wc*	7.90*b*
New Orleans	2.41	2.16	1.96	1.65	1.65	.90	....	....	....	....	.19	....	9.25
New York	2.69‡	2.44‡	....	1.60*de*	1.60*de*	.90*de*	1.70*de*	1.80*de*	....	....	.14*ce*	.14*wcc*	7.50*k*
Philadelphia	2.33	2.08	1.88	1.55‡	1.65‡	1.20‡	1.90	1.95	1.10	1.10	.155	.155*w*	8.20
Pittsburgh	2.45	2.20	2.00	1.65‡	1.65‡	1.85‡	2.25‡	2.25‡	1.50	1.50	.17	.17*z*	8.25
St. Louis	2.80	2.52	....	1.75‡	1.50‡	1 25/1.50‡	1.10*h*	1.10*h*	.75*g*	.75*g*	.125	.165*w*	8.00
San Francisco	....*u*	2.21	1.91	1.36	1.36	1.36	1.46	1.46	....	....	....	.20*aa*	7.55
Seattle	2.95*o*	2.75*o*	....	1.00*o*	1.00*o*	1.00*o*	2.00*o*	2.00*o*	....	....	.16	.16*y*	7.25

‡ Delivered. *a* 10c. allowed for each returnable bag. *b* 10c. per bbl. off for cash. *c* Plus municipal tax. *d* Per cu. yd. *e* Barge lots alongside docks. *f* Crushed granite. *g* F.o.b. Granite City, Ill. *h* F.o.b. plant. *i* Within three miles of Public Square. *j* 5% discount for cash. *k* Discount of 2 percent for cash in 10 days. *l* Up to 200 cu. yd. *m* 50c. off for cash. *n* 25 c.y. or more. *o* 2% off for cash. *p* 10c. per ton off, cash 15 days. *r* 10c. per bbl. off, cash 20 days. *s* 8% sales tax included. *t* 8% sales tax not included. *u* Price withdrawn. *v* 20c. per bbl. discount; 20c. allowed for returnable cloth bag. *w* Cinder. *x* Waylite. *y* Haydite. *z* Celocrete. *aa* Pumice. *bb* 4 x 8 x 12 in. *cc* Also 8 x 18 x 18 in.

CASH DISCOUNTS CEMENT to Contractors: truck delivery, 2% for cash on 10th of month; on carload deliveries, no trucking, same as dealer cash discount 10c. per bbl. for payment within 15 days of date of invoice. Subject discount 10c. per bbl. 20 days in Montreal.

CURRENT MAXIMUM PRICES RECEIVED AT CEMENT MILL

Charge for bags not included. For cloth bags, add 40c. per bbl.; 10c. refund allowed for each returnable bag; for paper bags add 15c. per bbl., not refundable

	Bagged	Bulk		Bagged	Bulk		Bagged	Bulk
Buffington, Ind.	$1.70	$1.65	Ironton, Ohio	$1.60	$1.55	Richard City, Tenn.	$1.80	$1.75
Dallas, Tex. (Inc. 9c. tax)	1.84	1.79	Limedale, Ind.	1.70	1.65	Steelton, Minn.	1.80	1.75
Hannibal, Mo.	1.70	1.65	Norfolk, Va.	1.75	1.70	Universal, Pa.	1.65	1.60
Hudson, N. Y.	1.75	1.70	Northampton, Pa.	1.55	1.50	Waco, Tex. (Plus 9c. tax in Tex.)	1.75	1.70
Independence, Kans.	1.70	1.65	North Birmingham, Ala.	1.70	1.65	Montreal (8% sales tax incl.) Discount 10c. per bbl. 20 days	1.68	1.67

PAVING BRICK, BLOCK, ASPHALT, ROAD OILS—F. O. B. CITY

	PAVING BRICK AND BLOCK Granite per M. lots of 50,000 4x4x8 in.	Brick per M 3x4x8½ in. carload lots	Wood per sq. yd. 3½ in. 16-lb. treat	PAVING ASPHALT Per ton, less than 80 penetration		ASPHALT BINDERS—FLUXES Per gal., 80–300 penetration		CUTBACK ASPHALT Per ton		ROAD OIL Per gal.	ASPHALT EMULSION (Quick-breaking) Per gal.	
				Tank car	Drums	Tank car	Drums	Tank car	Drums	Tank car	Tank car	Drums
Atlanta	$73.00	$39.35	$2.25	$18.53*e*	$24.62*e*	$0.0740*e*	$0.1309*e*	$0.0802*he*	$0.1348*h*	$0.0676*e*	$0.0826	$0.1384
Baltimore	150.00‡	48.00	80.00*m*	15.00*r*	21.00*r*	.06*r*	.09*r*	13.00*r*	23.00*r*	.065*r*	.07*r*	.14*r*
Birmingham	150.00	48.00	.....	17.95	.....†	.0747	......†	.0834*h*	......†	.065	.09	......†
Boston	80.00	57.00	3.75	14.20	20.00	.06	.09	.065*h*	.115*h*	.065	.09‡	.12‡
Chicago	150.00	55.00	1.80/2.00*d*	14.00	22.50	13.00*g*	21.50*g*	.0575*h*	.15*h*	.05*n*	.09/10*n*	.13/.15*n*
Cincinnati	120.00	50.00	.....	16.40	.....	.085	....	12.25	....	.07	.085	....
Cleveland	118.00	37.50	2.25	19.00	20.00	.09	.105	.10*h*	.15	.105	.09	.095
Dallas	......	36.00	.....	13.65	20.30	.06	.11	16.00	24.80	.06	.05/.07	.07/.09
Denver	......	66.11	.....	11.00	.....	10.00	....	.045*h*	....	....	....	......
Detroit	......	37.50	.....	18.06*f*	25.60*f*	.0743	.128	.0718*h*	.119*h*	.067	.0775	.1149
Kansas City	......	40.00	.....	18.50	23.50	.077	.1075	.077*h*	.107*h*	.057	.11	.15
Los Angeles	......	50.00	.....	9.00*b*	23.00	9.50*bg*	24.00*bg*	9.50*b*	....	.025	.072	.15
Minneapolis	......	.....	2.30*d*	.....	27.70	....	.126	....	32.64	....	....	....
Montreal	92.40	.....	.....	16.60*k*	24.25*k*	.116*k*	.1485*k*	.115*hk*	.135*hk*	.08*k*	.135*k*	.1885
New Orleans	......	.....	.....	13.50*a*	20.00*a*	.057	.088	.06*h*	.095*h*	....	.080	....
New York	......	70.00	.....	17.40	24.20*p*	14.00	....	.0725*h*	.1325*hp*	....	.0725*p*	.1225*p*
Philadelphia	140.00	58.00	4.06	15.00*r*	.....	14.00*r*	....	.065*hr*	....	....	14.00*gr*	....
Pittsburgh	135.00	38.75	.....	18.00	23.00	.09	.16	20.00	36.00	.07	.06	.11
St. Louis	......	37.00	.....	16.00	22.00	15.00*g*	21.00*g*	.0575*h*	.1213*h*	.648	.0525	.1125
San Francisco	......	40.00	.....	10.90	21.15	10.90*gr*	18.00*gr*	12.90	17.50*r*	9.50*gr*	.0525	.1125
Seattle	......	60.00*c*	.....	10.90*i*	23.40*i*	....	20.40*gi*	11.40*i*	....	....	.0525*i*	.0625*i*

‡ Delivered. *a* F.o.b. Baton Rouge. *b* Delivered to purchaser's warehouse. *c* 3½x4x8½ in. *d* 2½ in. 12-lb. treatment. *e* Local reduction due to 20% reduction intra-state class freight rates, only Georgia affected. *f* Mexican. *g* Per ton. *h* Per gallon. *i* F.o.b. Martinez. *j* 3x3½x8½ in. *k* Tax included. *m* Per thousand. † Available on priority only and quoted specially. *p* No steel drum shipments except to armed forces. *r* February 1943 prices, none later available.

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"STANG-DRIED" personnel and equipment will DRY UP that job of yours quick—TO STAY DRY—no matter where located! Don't plan on sheeting, cofferdams or compressed air until you see your nearest STANG man. He'll take over from plans to completion—save you time—money—trouble. Quit worrying—write or wire for "STANG-DRIED" service today!

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SAN DIEGO 2, CALIF. • 2322 NEWTON AVENUE
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IRON AND STEEL PRODUCTS—BASE MILL PRICES

	STRUCT. SHAPES-PLATE	REINF. BARS ¾-in billet *b*	RIVETS ½-in. structural	WIRE NAILS Base *d*	SHEET PILING Base	STEEL RAILS Per Gross Ton Standard	STEEL RAILS Light	STEEL RAILS Re-rolled	TRACK SUPPLIES Angle Bars	TRACK SUPPLIES Std. Spikes *c*	TRACK SUPPLIES Tie Plates *c*	TRACK SUPPLIES Track Bolts
Birmingham...	$2.10	$2.15	$3.75	$2.55	.....	$40.00	$40.00	$39.00	$2.70	$3.00	$2.15	$4.75
Chicago.......	2.10	2.15	3.75	2.55	$2.40	40.00	40.00	39.00	2.70	3.00	2.15	4.75
Pittsburgh.....	2.10	2.15	3.75	2.55	2.40	40.00	40.00	39.00	2.70	3.00	2.15	4.75
Buffalo........	2.10	2.15	.....	.....	2.40	.....	.....	.....	.....	.....	2.15	.....
Cleveland......	2.10	2.15	3.75	2.55	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown...	.....	2.15	.....	.....	.....	.....	.....	.....	.....	3.00	.....	.....
Detroit........	.....	2.27‡	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gulf ports.....	2.47*a*	2.52*a*	.....	.....	2.85*a*	.....	.....	.....	.....	.....	.....	.....
Pacific ports...	2.75*a*	2.80*a*	.....	3.05	2.95*a*	.....	.....	.....	.....	.....	2.30	.....

‡ Delivered. *a* F.o.b. cars dock. *b* Rail steel same as billet prices. *c* Other basing points include Portsmouth, O., Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., and Pacific coast ports, on tie plates alone, Steelton, Pa., spikes alone, Lebanon, Pa., Richmond, Va. *d* Add switching charge $18 per

IRON AND STEEL PRODUCTS—F.O.B. WAREHOUSE, PER 100 LB., BASE PRICE

	STRUCTURAL SHAPES Per 100 lb. base price	REINFORCING BARS* Per 100 lb., ¾ in., base price 15 tons or over *b* New billet	REINFORCING BARS* Rail steel	REINFORCING BARS* Add Switch	REINFORCING BARS* $/cwt. for Del.	EXPANDED METAL LATH Per 100 sq.yd., carload lots Std. diamond mesh, 3.4 lb	EXPANDED METAL LATH Std. ribbed 3.4 lb.	WELDED FABRIC REINFORCING Per 100 sq.yd., carload lots 4x16 in., No. 5 & 10 wires	WELDED FABRIC REINFORCING 4x12 in., No. 8 & 12 wires	WELDED FABRIC REINFORCING 6x6 in. No. 6 · 6 wires Per sq. yd	SHEET PILING Per 100 lb base price
Atlanta..........	$2.34	$2.40	$2.40	$.02½	$.10	$21.06	$23.00	$1.82	$1.35	$0.1719	$3.04
Baltimore........	3.70	2.90	2.75	......	.10	22.50	24.50	1.70	1.27	.1611	3.00
Birmingham.....	2.10*a*	2.15	2.15	.02½	.10	19.00	21.00	1.80	1.34	.1701	....
Boston..........	3.85	3.51	3.36	$20 C.L.	.10	18.50	29.50	1.76	1.31	.1656	2.70
Chicago..........	2.10*a*	2.15	2.15	.03	.05	21.50	23.50	1.67	1.25	.1575	2.40
Cincinnati.......	3.68	2.53*cd*	2.53*cd*	......	.05	19.50	21.50	1.66	1.25	.1566	....
Cleveland........	2.10*a*	2.15	2.15	.02½	.10	19.50	21.50	1.66	1.25	.1566	....
Dallas...........	4.25	3.17	3.17	......	....	25.00	27.50	1.93	1.42	.1827	....
Denver..........	4.57	4.842	3.85	......	....	26.50	26.50	1.97	1.45	.186	....
Detroit..........	3.65‡	2.52‡	2.52‡	......	.10	30.00	30.00	1.68	1.26	.1584	2.66
Kansas City.....	4.19	2.61*cd*	2.61*cd*	.0	.05	24.50	26.50	1.78	1.33	.1683	2.874
Los Angeles......	3.65*f*	2.575	2.425	.02½	.05	23.00	27.50	1.93	1.42	.1827	3.65
Minneapolis......	3.81†	2.73	2.73	.0	.10	25.00	27.00	1.80	1.34	.1701	2.73*d*
Montreal........	4.00*ij*	2.90*i*	2.80*i*	......	....	26.00*hij*	33.00*hij*	2.56*i*	3.14*i*	.268*i*	....
New Orleans.....	4.229‡*k*	2.52	2.52	.05	.10	21.50	23.50	1.82	1.35	.1715	2.875
New York.......	3.75	2.76*e*	2.76*e*	......	.15	17.50	19.50	1.76	1.32	.1665	2.74
Philadelphia.....	3.66	3.82	....	......	....	19.50	21.50	1.71	1.28	.1611	2.72
Pittsburgh.......	2.10*a*	2.15	2.15	.02½	.10	23.00	26.50	1.59	1.20	.1503	2.40
St. Louis........	3.697	2.74	2.74	.0	.05	28.00	34.00	1.69	1.27	.1602	2.70
San Francisco....	4.35	2.825	....	.02½	.10	21.00	24.50	1.93	1.42	.1827	3.85
Seattle..........	2.75*e*	2.80*e*	....	......	....	34.50	38.50	1.93	1.42	.1827	2.95*e*

‡ Delivered. *a* Mill prices. *b* 5-15 tons, add 15c. 1-5 tons, add 25c. Less than 1 ton, add 50c. *c* 20 tons or over Base. *d* Mill price plus freight. *e* F.o. dock. *f* Includes delivery in free delivery zone. *g* Less than 1 ton, add 25c.; 1 to 5 tons, add 10c. * High scrap steel prices cut former 15c. differences between ne billet and rail steel in many mills. *h* List price. *i* Plus Dominion and Province sales tax. *j* August 1942 price; not on market. *k* Quotation on changed basis; n actual price change.

PLUMBING, HEATING, WATER, SEWER AND DRAIN PIPE

	C. I. PIPE Per net ton f.o.b. 6 in. to 24 in. *a*	VITRIFIED SEWER PIPE Per foot, std. 8 in., s.s.	VITRIFIED SEWER PIPE Delivered std. 12 in., s.s.	VITRIFIED SEWER PIPE ASTM 24 in.,	VITRIFIED SEWER PIPE C13–35 36 in.,	CLAY DRAIN TILE Per 1,000 ft., carload lots, f.o.b. 6 in.	CLAY DRAIN TILE 8 in.	CONCRETE SEWER PIPE Per ft., delivered; ASTM 12 in.	CONCRETE SEWER PIPE C 14–35 24 in.	WROUGHT STEEL PIPE Full standard weight, *h* 1 to 3 in., Butt Weld Black %	WROUGHT STEEL PIPE Butt Weld Galv. %	WROUGHT STEEL PIPE 3½ to 6 in.; Lap Weld Black %	WROUGHT STEEL PIPE Lap Weld Galv. %
Atlanta..........	$49.66	$0.26*b*	$0.468*bc*	$1.8525	$4.68*c*	$85.00	$128.00	$0.45	$1.642	48.2	54.2	59.7	51.2
Baltimore........	53.00	.35	.60	2.65	7.25	160.00	200.00	.50	1.75	65.5	57.5	63.0	54.5
Birmingham.....	45.00	.275	.495	1.95	5.50	100.00	220.00	.50	1.70	62.2	54.2	59.7	51.2
Boston..........	55.40	.26	.463	2.07	5.85	140.00	......	.60	......	....	....	....	....
Chicago..........	54.33	.35	.675	2.70	7.00	100.00‡	150.00‡	.45	1.85	66.0	55.0	64.5	53.0
Cincinnati.......	53.27	.231	.4455	1.80	5.125	105.00	170.00	.60	1.70	57.1	43.4	54.0	39.6
Cleveland........	54.75	.196	.378	1.62	4.715	81.00	125.00	.30	1.60	68.5	57.5	66.0	54.5
Dallas...........	56.43	.31	.58	2.25	5.00	90.00	110.00	.46	1.57	59.9	51.9	57.3	48.3
Denver..........	61.56	.29†	.52†	2.16†	3.00*n*	125.00	200.00	1.00	2.22	58.4	50.4	55.7	47.2
Detroit..........	54.75	.35	.675	2.70	7.75	135.00	180.00	.40	1.75	57.7	44.0	54.8	40.6
Kansas City.....	55.73	.315	.39	2.20	5.86	140.00	260.00	.45	1.60	35.6	46.1	46.2	59.4
Los Angeles......	68.40	.282†	.508†	2.034†	5.085†	115.50	192.50	1.00	2.00	61.1	50.1	58.6	47.1
Minneapolis......	59.00	.275†	.495†	1.98†	5.37†	......	......	.90	2.10	64.2	53.2	60.7	49.2
Montreal........	60.00	.85*o*	1.50*o*	5.25*p*	8.50*ep*	45.00*m*	64.00*m*	.48*m*	1.92*m*†	....	....	....	....
New Orleans.....	51.78	.26	.48	1.69	......	150.00	220.00	.45	1.65	62.4	54.4	58.8	50.3
New York.......	52.40	.322	.621	2.61	6.65	......	......	.60	1.40	64.9	53.9	62.4	50.9
Philadelphia.....	51.00	.30	.58	2.50	7.50	150.00	225.00	.45	1.75	56.6	42.8	53.6	39.1
Pittsburgh.......	56.00	.245†	.4725†	1.845†	5.4325	97.80	154.20	.85*g*	2.00*g*	68.5*i*	57.5*i*	66.0*i*	54.5*i*
St. Louis........	53.62	.28	.504	2.016	4.50	85.00	220.00	1.00*j*	2.15*k*	56.4	42.6	52.5	38.4
San Francisco....	68.40	.3625*d*	.6525*d*	2.61	6.52	115.00	192.50	.58	2.34	45.0	31.0	41.0	26.0
Seattle..........	70.20	.375	.675	2.70	6.75	84.00	187.50	.51*f*	1.44*f*	....	....	....	.....

‡ Delivered. †F.o.b. *a* B. & S. class B and heavier, C/L lots, 200 tons and over Burlington, N.J. (base) $49.00. Based on existing freight rates; subject to rate change. Gas pipe and class A, $3 per ton additional, 4 in., $3 per ton additional, 30 in. and larger usually $2 per ton less. *b* Double strength. *c* List to dealer. *d* List. *e* 30-inch. *f* Less 5% for cash. *g* Culvert pipe. *h* Discounts from standard list consumers carload prices, except Pittsburgh prices are f.o.b. mill. Base price $200 per net ton. List prices per ft.; ½ in., 8½c.; ¾ in., 11½c.; 1 in., 17c.; 2 in., 37c.; 2½ in., 58½c.; 3 in., 76½c.; 4 in., $1.09; 6 in., $1.92. 3 percent tax on transporation costs not included. *i* Applies also at Lorain, Ohio, mills. Chicago delivered base is 2½ points le on butt, 1½ on lap. Freight is figured from Pittsburgh, Lorain, O., Chica Dist. Billing is from point producing lowest price at destination. WROUGH IRON PIPE: Base price and list prices per ft. same as wrought steel pipe. Di count for Pittsburgh base: Butt-weld—1 in. and 1¼ in. black 34, galv. 16; 1 in. black 38, galv. 18½; 2 in. black 37½, galv. 18. Lapweld—2½ in. to 3½ i black 31½, galv. 14½; 4½ in. to 8 in. black, 32½ galv. 17. *j* Reinforced; spe C 76–37. *k* Reinforced; spec. C 75–37. *l* Plus sales tax. *m* Tax includ *n* 27-in. pipe. *o* Less 50%. *p* Less 53%.

NEWS OF THE WEEK

(Continued from p. 59)

The Water Division, OWU is re-organized

On October 26, reorganization of the Vater Division of the Office of War Utiliies was effected in which the activities nd functional operations of the division ere consolidated into Water Supply and aterials Distribution sections. The genral functions of these were established s follows:

VATER SUPPLY SECTION

1. Obtain from federal agencies, the apropriate industries, and other sources, data earing on requirements for water and prere estimates of future requirements for ater;

2. Ascertain and investigate the adequacy water supply systems and water resources r meeting the above requirements;

3. Program the use of existing facilities, e interconnection of systems, and the codination of operations of systems where ch activities will provide greater availbility of water;

4. Prepare programs, recommend, and ke the appropriate steps to develop the nstruction and installation of additional cilities necessary to correct inadequacies existing facilities, with a minimum expenture of critical materials;

5. Advise the Facility Clearance Board, rmy and Navy Departments, other Divisions WPB, and other planning agencies as to e availability of water at proposed locaons for war plants or establishments; and

6. Work out arrangements with utilities r water service connections to major war dustries.

ATERIALS DISTRIBUTION SECTION

1. Analyze and recommend priority and location actions on applications for authoration of construction of water projects her than extensions to housing projects;

2. Process CMP forms covering allocation controlled material for approved conruction;

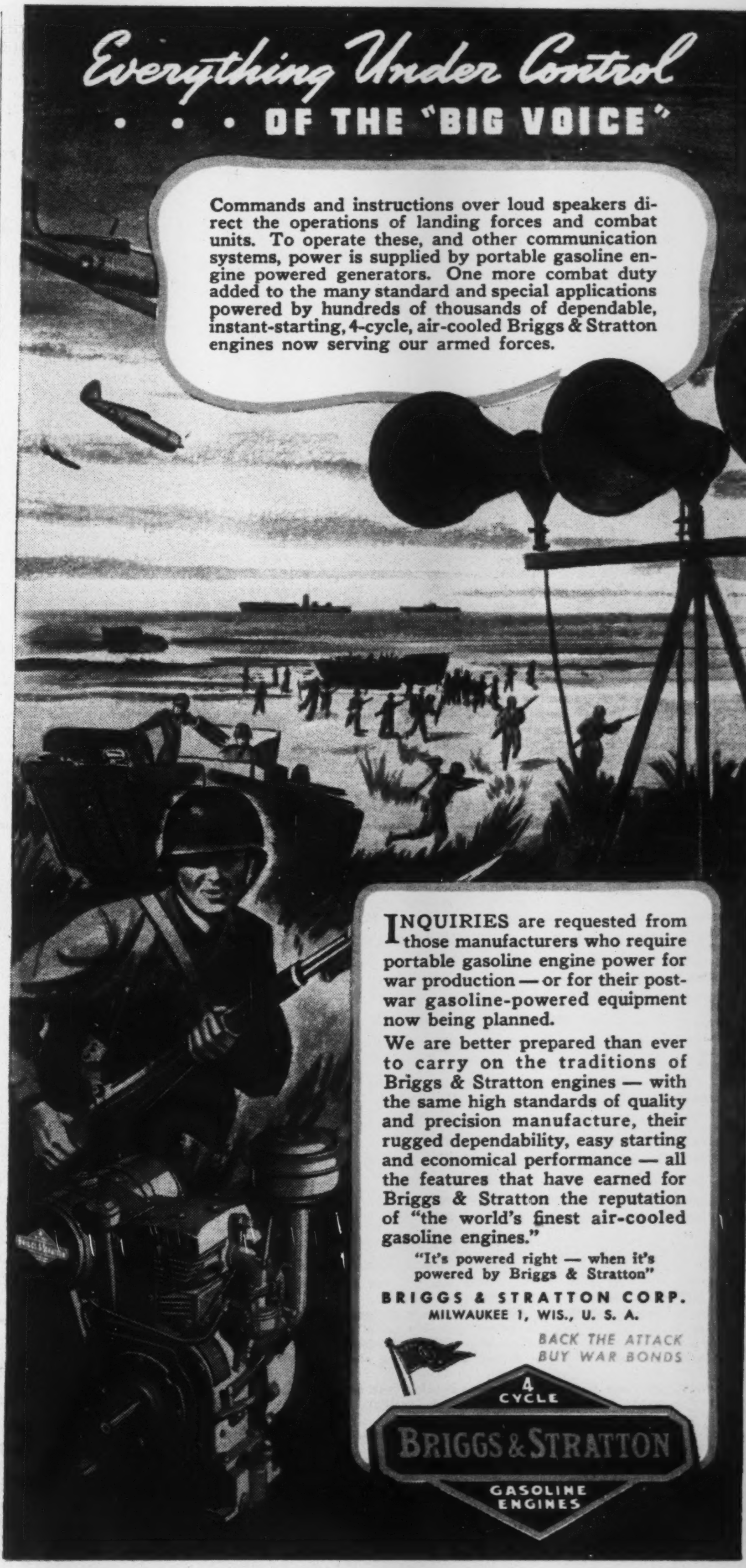
3. Follow up the approval of water works nstruction, and through appropriate actions sist in expediting deliveries of materials d equipment to water works projects to sure their completion as scheduled;

4. Cooperate with the Equipment Producon Branch of OWU in connection with its risdiction over manufacturers of water orks equipment.

5. Maintain necessary contacts with other dustry Divisions and with manufacturers assure an adequate supply of materials d equipment required for water works nstruction, operation and maintenance; and

6. Develop through cooperation with the ventory Control Branch of OWU more efctive use of water works material and uipment available in plant and in excess ventory of utilities and of other agencies.

The Administrative Officers identified



Commands and instructions over loud speakers direct the operations of landing forces and combat units. To operate these, and other communication systems, power is supplied by portable gasoline engine powered generators. One more combat duty added to the many standard and special applications powered by hundreds of thousands of dependable, instant-starting, 4-cycle, air-cooled Briggs & Stratton engines now serving our armed forces.

INQUIRIES are requested from those manufacturers who require portable gasoline engine power for war production — or for their postwar gasoline-powered equipment now being planned.

We are better prepared than ever to carry on the traditions of Briggs & Stratton engines — with the same high standards of quality and precision manufacture, their rugged dependability, easy starting and economical performance — all the features that have earned for Briggs & Stratton the reputation of "the world's finest air-cooled gasoline engines."

"It's powered right — when it's powered by Briggs & Stratton"

BRIGGS & STRATTON CORP.
MILWAUKEE 1, WIS., U. S. A.

BACK THE ATTACK
BUY WAR BONDS

4 CYCLE
BRIGGS & STRATTON
GASOLINE ENGINES

LUMBER, TIMBER PLYWOOD—PER M FT., B.M., CARLOAD LOTS F.O.B.

	SHORT LEAF YELLOW PINE AND DOUGLAS FIR — All S. L. Y. P. is No. 2 common or better and for No. 1 N. C. Box. (Prices in Bold Face) *All Fir planks No. 2 common, Fir timber is No. 1 common. Lengths up to 20 ft. (Prices in italics)*									LONG LEAF Y. P. Merchantable grade up to 20 ft.		PLYWOOD Rail freight increment (See note for base price)	
	1x6 S4S	1x8 S4S	2x4 S4S	2x6 S4S	2x8 S4S	2x10 S4S	3x12 Rgh	6x12 Rgh	12x12 Rgh	2x12 Rgh	12x12 Rgh	⅝"	¾"
Atlanta........	$37.00	$37.00	$32.00	$31.00	$31.00	$34.50	$49.00	......	......	$58.00	$66.00	$17.90	$21.85
Baltimore......	42.00	45.00	42.00	42.00	43.00	48.00	65.00	......	......	115.00	120.00	18.25	22.25
	48.00	*48.00*	*55.00*	*55.00*	*55.00*	*55.00*	*68.00*	*$70.00*	*$70.00*	......	......	......	......
Birmingham...	34.50	36.50	32.00	32.00	34.00	34.00	53.00	53.00	56.00	......	......	17.35	21.15
¹	37.50	37.50	37.00	37.00	37.00	43.00	65.00	......	......	67.50	70.00	......	......
Boston........‡*	42.00³	45.00³	55.00³	60.00³	60.00³	65.00³	75.00³	......	......	85.00³	......	18.25	22.25
‡*	*50.00*	*50.00*	*55.00*	*60.00*	*65.00*	*70.00*	*80.00*	*85.00*	*85.00*	......	......	......	......
Chicago........	50.00	51.00	50.00	49.00	50.00	54.00	67.00	......	......	80.00l	95.00l	14.60	17.80
	50.00	*50.00*	*47.50*	*47.00*	*47.00*	*48.00*	*57.00*	*56.00*	*58.00*	......	......	......	......
Cincinnati......	41.00	42.50	39.00	40.50	42.00	43.00	53.00	......	......	65.00	68.00	17.35	21.15
	......	......	......	......	......	......	*55.50*	*55.50*	*55.50*	......	......	......	......
Cleveland......	42.50k	42.50k	52.50k	51.00k	65.00	65.00	83.00	83.00	83.00	......	......	17.75	21.60
Dallas.........e	44.25	44.25	41.50	40.00	40.00	42.00	57.50	55.50	55.00	83.50	80.50	14.60	17.80
Denver........‡	64.00⁴	62.00⁴	65.00⁴	65.00⁴	65.00⁴	66.00⁴	69.00⁴	*83.00*	*89.00*	......	......	10.45	12.70
Detroit........	61.00	61.00	57.75	57.75	57.75	62.75	72.75	......	90.00	70.75	90.00	17.35	21.15
	57.00	57.00	57.00	57.00	62.75	*63.75*	*71.00*	*75.00*	*75.00*	......	......	......	......
Kansas City.. a	64.00	64.00	62.00	60.50	62.00	64.00	79.00	......	......	79.00	89.00	12.60	15.40
	60.00	*60.00*	*58.00*	*58.00*	*58.00*	*58.00*	*75.00*	*80.00*	*80.00*	......	......	......	......
Los Angeles....a	*58.50*	*58.50*	*58.50*	*59.00*	*60.25*	*60.25*	*75.75*	*74.25*	*74.25*	......	......	9.90gh	12.06
Minneapolis....‡b	59.00⁸	59.00⁸	......	......	......	......	......	......	......	......	......	12.60	15.40
‡	*55.50*	*55.50*	*54.25*	*54.50*	*53.50*	*54.75*	*64.75*	*63.50*	*63.50*	......	......	......	......
Montreal......†⁷	*52.00*	*55.00*	*48.00*	*52.00*	*54.00*	*60.00*	......	......	......	200.00	200.00	......	......
	48.50	*48.50*	*45.25*	*45.25*	*45.25*	*46.75*	*50.00*	*50.00*	*50.00*	......	......	......	......
New Orleans...	37.50	37.50	32.50	31.50	31.50	35.00	46.00	......	......	52.50	69.00	14.60	17.80
	31.00	*31.00*	*33.00*	*31.00*	*34.00*	*32.00*	*33.00*	......	......	......	......	......	......
New York......	60.50	61.50	56.25	55.25	56.25	59.50	67.50	......	......	120.00f	125.00f	18.35	22.25
‡	......	......	*65.00i*	*65.00i*	*65.00i*	*65.00i*	[Range from $75 to $95]			......	......	......	......
Philadelphia...	65.00	63.00	62.00	61.00	61.00	64.00	84.00	......	......	126.00	122.00	18.25	22.25
	[$70.00	*to $85.00]*	*75.00*	*75.00*	*75.00*	*75.00*	*77.50*	*$85 to $105*	*$85 to $105*	......	......	......	......
Pittsburgh.....	50.80	53.20	62.75	55.00	60.85	62.50	76.25	......	......	......	......	18.10	22.05
	69.20	*68.10*	*66.10*	*65.30*	*65.20*	*65.65*	*88.75*	*88.75*	*88.75*	......	......	......	......
St. Louis......‡c	56.00	56.00	53.00	52.00	53.00	56.00	69.00	*75.00*	*75.00*	86.00	85.00	14.60	17.80
San Francisco..d	*36.00*	*36.00*	*34.00*	*34.00*	*33.25*	*33.25*	*39.00*	*38.25*	*38.75*	......	......	7.30g	8.90g
Seattle........	*35.00*	*35.00*	*35.00*	*35.00*	*35.00*	*35.00*	*40.00*	*40.00*	*40.00*	......	......	0.00	0.00

Bold Face type, Southern Pine. *Italics, Douglas Fir.* ¹ Long leaf. ² Roofers' N. C. Pine. ³ Spruce. ⁴ Native. ⁶ Western Pine, No. 3 Common. ⁷ Spruce. ⁸ Norway Pine. ‡ Delivered. a Yard prices. b Contractors discount in Minneapolis and St. Paul discontinued May 21, 1938. c 5M ft. or less. d F.o.b. cars San Francisco freight rate. e 10% discount taken off. f Up to 18 ft. † Plus sales tax. * Prices for truck delivery; no longer quoting carload lots f. o. b. city.

Note: Special concrete form grade Fir Plywood, 4' by 8' panels, 5-ply, sanded 2 sides, water resistant glue, carload lots, delivered per 1,000 sq. ft. surface. Seattle base price on ⅝", $95.15; on ¾", $104.85; price includes oiling and sealing charges. For other centers add rail freight increment from table or proper size. For resin dipped treatment, add $10.50 per M. g Lower rate by water shipment h 50,000 lb. minimum i Ranges from $65 to $69. j Average price k August price. l September price; none later available.

GLASS, EXPLOSIVES, CHEMICALS

	WINDOW GLASS — Discounts from jobbers list, Aug. 15, 1938 Single or Double Thickness		EXPLOSIVES — Per lb. 40% Ammonia Gelatin in 50-lb. cases delivered in 200 lb. lots*
	A quality	B quality	
Atlanta............	75%	75%	$0.15
Baltimore..........	78%	79%	.15
Birmingham.........	76%	76%	.105
Boston.............	77%	78%	.15
Chicago............	77%	77%	.15
Cincinnati	77-10%	77-10%	.15
Cleveland..........	77-10%	77-10%	.19
Dallas.............	76%	76%	.1625
Denver.............	76%	76%	.155e
Detroit............	77%	77%	.1575
Kansas City	77-10%	77-10%	.155
Los Angeles........	86%d	88%d	.1575
Minneapolis........	77%	77%	.155
Montreal...........	40-5%‡	47%‡	.1675†
New Orleans	70%	75%	.16
New York...........	81%	82%	.22f
Philadelphia.......	78%	79%	.15
Pittsburgh.........	79%	79%	[illegible]
St. Louis..........	77-10%	77-10%	.155
San Francisco......	66%	73%	.155
Seattle............	75%	75%	.1575†

Price of 60% Ammonia Gelatin in $0.01 per lb. higher than 40%

a Disc. from list Sept. 1939. b Also less 6% tax exemption. d Discount from jobbers' list Sept. 15, 1928. ‡ Sales tax included.

* Urban prices influenced by service charges or local storage and delivery regulations, do not consistently reflect quantity prices in less congested areas. e F.o.b. Louviers, Colo. f In boroughs of Kings, Queens and Richmond, and in Manhattan south of Canal Street, add delivery charge of $6.00 per trip † F.o.b.

40% Ammonia Gelatin price ranges in other than urban areas, per lb.
(except Seismograph Grades)

	C/L 20,000 lb. net	Tons	200 lb. lots
E. of the Miss., except Fla. and Me.	$0.105	$0.13	.15
W. of Miss. to Rocky Mtn. States, Fla. and Maine.	.11 -.1175	.135 -.1475	.155 -.1675
Rocky Mtn. States......	.11 -.[illegible]	.135 -.1525	.155 -.1725‡
Pacific N. W. States.....	.1075-.12	.1375-.15	.1575-.17
Pacific S. W. States.....	.1050-.1125	.135 -.1425	.155 -.1625

‡ F.o.b. Louviers, Colo. or Butte, Mont.

PILES, TIES—F.O.B.

PILES

Prices per linear foot, fir and pine, bark on, f.o.b. cars, New York. Fir based on Wash. and Ore. points to New York shipping area; pine based on freight from Norfolk.

Dimensions	Points	Length	By Rail — Pine	By Rail — Fir
12-in. at butt................	6-in.	30 to 50-ft.	$0.33	...
12-in.— 2-ft. from butt......	6-in.	50 to 59-ft.	.34	...
12-in.— 2-ft. from butt......	6-in.	60 to 69-ft.	.35	...
12-in.— 2-ft. from butt......	6-in.	90 to 100-ft.	....	.515
13-in.— 3-ft. from butt.......	5-in.	91 to 100-ft.	....	.56
14-in.— 2-ft. from butt......	6-in.	50 to 69-ft.	.40	.50
14-in.— 2-ft. from butt......	6-in.	70 to 79-ft.	.41	.54
14-in.— 2-ft. from butt......	5-in.	80 to 85-ft.	.52	...
14-in.— 2-ft. from butt......	5-in.	85 to 89-ft.	.55	....
14-in.— 2-ft. from butt......	5-in.	90 to 100-ft.	....	.575

RAILWAY TIES

Prices f.o.b., per tie for carload lots:		6"x8"x8' Untr.	6"x8"x8' Tr.	7"x9"x8'6" Untr.	7"x9"x8'6" Tr.
Boston	Oak................	$1.50	....	$2.00	....
	Pine................	2.00	$3.00a	2.50	$3.50a
New York......	S. L. Sap Pine......	1.43/1.54	2.59	1.76	2.86
	Mixed Oak..........	1.71	2.59	2.42	3.58
Birmingham....	White Oak..........	1.00	1.60a	1.30	2.25a
Chicago........	Red Oak...........	....	2.19a	....	2.87/3.00
Los Angeles....	Douglas Fir.........	1.10	1.75a	1.60	2.50a
Philadelphia....	Red Oak...........	....	2.10ag	....	3.25ag
St. Louis.......	White Oak..........	1.48	....	2.04	....
	Red Oak...........	1.48	2.05a	2.04	2.83a
	Sap Pine or Cypress.	1.35	....	1.91	....
San Francisco...	Douglas Fir.........	1.25bef	....	....	3.00a
Montreal.......	Birch or Maple......	.85	.95	....†	....†

Tr.— Treated; Untr.— Untreated. a Creosoted b 6"x8"x8'6". c Empty cell. d Zinc. e Green. f F.o.b. cars. † Out of market. g January price; none later available.

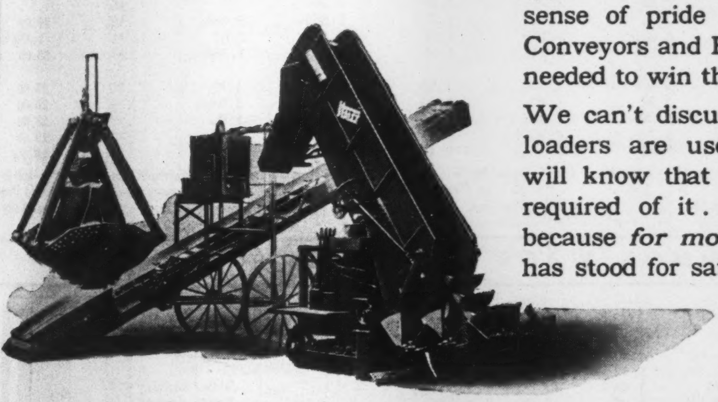
CHEMICALS

Water, sewage treatment, road work, f.o.b. carlots, New York

Bleaching powder, in drums, f.o.b. works, per 100-lb..........	$2.50- 3.1
Chlorine cylinders, liquid, per lb. delivered..................	.0
Calcium chloride, 77–80%, flaked, 100-lb. paper bag, del'd, ton	18.50-35.0
Silicate of soda, 52 deg., in drums, f.o.b. works, per 100 lb.......	1.
Soda ash, 58%, in paper bags, per 100 lb. dense...............	1.1
Sulphate of aluminum, commercial, in 100-lb. bags, per ton.....	23.00-25.0
Sulphate of copper, in bbl., per 100-lb.......................	5.0

Ordered to Duty in CENSORED

Today's war is one of MEN, MACHINES and SPEED. Like lightning the Allies strike with a shock that reels back the enemy—certain evidence of the teamwork, planning and genius of our armies, engineers and construction battalions. Of the construction equipment speeding us on to victory all three types made by Haiss are at the front. We feel a sense of pride and satisfaction in that Loaders, Conveyors and Buckets, too, are fighting equipment needed to win the war.



We can't discuss where or how our buckets and loaders are used; but wherever they are, you will know that a Haiss unit will give the service required of it . . . We and you both *know* that, because *for more than 50 years* the Haiss name has stood for satisfactory service.

GEORGE HAISS MANUFACTURING CO., Inc., 140th St. & Rider Ave., New York 51, N. Y.

DISTRIBUTORS COAST TO COAST

●

Write, wire or phone for prices, catalogs and deliveries

HAISS

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

	STRUCTURAL CLAY TILE—PARTITION—SCORED Per M. lots of 2,000 pieces or over, 3x12x12 in.	4x12x12 in	8x12x12 in.	STRUCTURAL CLAY TILE—LOAD BEARING—SCORED * Per M. lots of 2,000 pieces or over, 8x12x12 in.	10x12x12 in.	12x12x12 in.	BRICK Per M. in quantity. Common backing	Straight hard	LIME Per ton, Hydrated finishing	In paper, Common hydrated	Carload lot, Pulverized, or lump
Atlanta	$104.00	$114.00	$199.00	$234.00	$244.00	$250.00	$13.50	$18.04	$26.54	$15.04	$15.04
Baltimore	84.00	90.00	170.00	200.00	260.00	320.00	15.00k	19.00k	18.00	13.00	2.50m
Birmingham	80.00	85.00	160.00	191.00	252.00	288.00	14.50	17.00	18.11	13.64	2.25lo
Boston	89.35a	93.30a	178.70a	202.50	271.80	308.70	16.50i	19.50i	17.50†	12.50†	14.92†
Chicago	72.00	77.00	145.00	197.00	243.00	278.00	12.50	13.50	17.00	15.00	12.50
Cincinnati	65.55	69.90	131.20	148.70	210.35	240.45	22.00	22.00	15.50	13.00	.....
Cleveland	60.00	64.00	120.00	144.00	193.00	221.00	17.00	17.00	15.75j	13.25j	3.00jm
Dallas	62.50	67.50	135.00	162.00	212.50	263.00	13.50i	15.00i	19.00	15.00	.95n
Denver	84.80	95.40	153.70	178.20	212.00	227.90	14.50	18.00	25.00j	17.00j	20.00j
Detroit	86.05	91.80	172.10	213.00	268.00	330.00e	20.00	21.00	18.00	16.00	16.00
Kansas City	67.00	69.00	89.00c	128.00	163.00	189.00	14.50	15.50	19.32	13.00	10.92
Los Angeles	73.50†r	89.50†r	128.00c†r	210.00†r	368.00†r	460.00†r	13.50	15.00	16.50	17.50	17.50
Minneapolis	81.95b	87.40b	148.70b	......	179.30b	249.35b	13.60	15.60g	21.00	16.00	19.00
Montreal	99.10a	105.65a	154.75a	101.65at	154.75au	155.25	24.16†u	27.25†u	24.60u	18.00u	.....
New Orleans	72.00	72.00	135.00	162.00	210.00	260.00	14.00	.....	18.30	12.08	14.10
New York	78.40	83.60	115.00c	193.30h	238.80h	295.60h	16.50/17.50	.....	20.00	14.00	17.00
Philadelphia	85.30	91.00	170.50	186.30	235.00	261.10	17.00	20.00	19.00	13.00	15.00
Pittsburgh	62.35	66.55	124.75	140.25	173.25	198.00	17.50	19.50	17.90	15.40	2.55m
St. Louis	67.00	95.00	130.00	190.00	244.00	290.00	18.00	17.00	22.00	18.00	2.50m
San Francisco	96.00	108.00	144.00	......	......	......	19.00	.....	24.00	23.00	2.50m
Seattle	115.00	125.00	230.00	......	......	......	20.00f	21.00f	20.00s	20.00s	20.00s

† F.o.b. *a* Smooth. *b* Carload lots delivered to job. *c* 6x12x12 in. *d* Not load bearing. *e* 48 lb. tile. *f* Less $1.00, ½ cash 15 days, balance 30 days. *g* Selected common. *h* F.o.b. Perth Amboy, N. J. *i* F.o.b. Warehouse only. *j* LCL. *k* $1.00 discount if paid in 10 days. *l* Lump. *m* Per bbl., 180 lb. *n* Per sack 100 lb. *o* Per bbl., 200 lb. *p* 280 lb. bag. *r* 5% discount 10 days. *s* 2% discount for cash. *t* 5½x8x12. *u* 8% sales tax included.

PAINT, ROOFING—F.O.B. CARLOAD LOTS

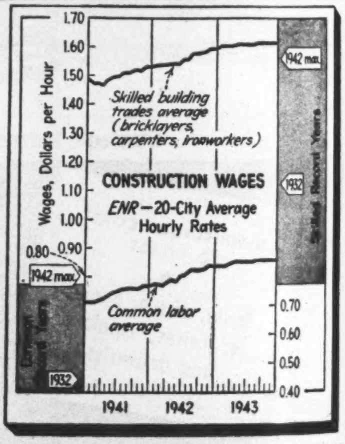
	RED LEAD Per 100 lb. in. 600-lb. (Approx.) bbl. Dry *a*	WHITE LEAD Per 100 lb. in oil	READY-MIXED PAINT Per gal., drums Graphite *b*	Aluminum *b*	Ferric Oxide *d*	ROOFING SUPPLIES Carload lots f.o.b. factory Rolls, slate surfaced, 85–90 lb. per sq.	Asphalt felt, per 100 lb.	Tar felt, per 100 lb.	Asphalt coating per gal.	Tar pitch 350 lb. bbl. per ton
Atlanta	$10.25	$14.125	$1.30	$2.25	$1.20	$1.90	$1.61	$1.61	$0.27	$29.00
Baltimore	10.00	13.75	2.00	3.00	2.50	2.30	2.70	2.70	.40	29.00
Birmingham	10.25	14.125	2.35	3.50r	1.98r	2.04	1.97	1.97	.32	28.35
Boston	10.00	13.75	1.65	....	2.30	2.10‡	1.65h‡	1.65h‡	.50‡	21.00‡
Chicago	10.00	13.75	....	....	....	1.75hf	1.74hf	1.82hf	.33f	23.00f
Cincinnati	10.00	13.75	1.70	2.90	1.60	2.40	2.39h	2.39h	.36	21.00
Cleveland	10.00	13.75	2.10	2.90	1.95	1.93	1.83h	1.83h	.35	29.00
Dallas	10.00	14.50	1.88	2.11n	.05l	1.75h	1.66h	1.66h	.35	39.00
Denver	10.50	14.25	1.65	14.25k	.27l	2.45	3.15	3.15	.35	28.00
Detroit	10.00	13.75	1.75	3.00	1.60	2.25	2.25	2.25	.50	23.00
Kansas City	10.00	13.875	2.39g	2.55gr	2.16g	2.10	2.30	2.30	.28	27.50
Los Angeles	10.25	14.25	1.60	2.25	2.30	2.10	1.50	....	.45	.....
Minneapolis	10.00	13.875	....	....	....	1.75i	1.66hi	1.66hi	.32	23.00
Montreal	9.25	6.25	2.50p	4.90p	3.15p	2.67	2.47	2.07	.94	1.85k
New York	10.00	13.75	2.03	....r	1.64	1.66	1.58h	1.58h	.26	25.00
Philadelphia	10.00	13.75	1.60/1.80	2.20r	1.55	1.75	1.66	1.66	.32	23.00
Pittsburgh	10.00	13.75	1.05	1.95	.80	1.95	1.94h	1.94h	.34	26.00
St. Louis	10.00	13.75	2.28s	2.89s	1.96s	1.66	1.66	1.66	.28	23.00
San Francisco	10.25	14.00	1.80	2.75n	1.35	1.71	2.40	2.40	.33	19.50
Seattle	10.25	14.25	1.90	3.00	....	2.15	2.16h	....	.35	26.50j

‡ Delivered. Note: Red lead in oil 50c. higher than white lead in oil. *a* Red lead prices change frequently due to pig lead price charges. *b* U. S. War Dept. Spec. 3-49A. *c* ASTM Spec. D266-31. *d* 80% minimum ferric oxide. *e* Subject to 25% discount. *f* Distributors' price to contractors. *g* 5 gal. can. *h* Per roll, 65 lb. *i* Minneapolis and vicinity. *j* Asphalt pitch. *k* Per 100 lb. *l* Per lb. *m* Per bbl. *n* May, 1941 price, no later quotation available. *p* Plus 8% sales tax. *r* Not available, except on priority rating; then quoted specially. *s* December, 1942 price.

SKILLED AND COMMON WAGE RATES—PER HOUR

	Bricklayers	Carpenters	Struct. Iron Workers	Hoisting Engineers	Plasterers	Common Labor Building	Heavy Const.
Atlanta	$1.50	$1.25	$1.50	$1.25	$1.50	$0.40	$0.50
Baltimore	1.75	1.375	1.80	1.625/1.80	1.50	.75	.75
Birmingham	1.75	1.25	1.50	1.25/1.50	1.50	.65	.65
Boston	1.625	1.50	1.65	1.875	1.667	.80/1.00	.80/1.00
Chicago	1.75	1.70	1.76	1.75	1.825	1.10	1.10
Cincinnati	1.75	1.50	1.675	1.45/1.60	1.625	.85	.85
Cleveland	1.875c	1.55	1.75	1.75	1.75	1.00/1.25	1.00/1.25
Dallas	1.625	1.25	1.50	1.75	1.625	.60	.75/1.25
Denver	1.65b	1.50b	1.50b	1.50b	1.65b	.80b	.80b
Detroit	1.675	1.50	1.75	1.625/1.75	1.675	.90	.90
Kansas City	1.65	1.50	1.625	1.625	1.65	.90	.90
Los Angeles	1.50	1.35	1.625	1.375	1.667	.875	.875
Minneapolis	1.50	1.375	1.50	1.40	1.50e	.925	.925
New Orleans	1.50	1.25	1.50	1.50	1.375	.65	.75
New York	2.00b	1.85b	2.00	2.00b	2.00b	1.031	.95
Philadelphia	1.90	1.50	1.90	2.00	2.00	.825	.825
Pittsburgh	1.90	1.75	1.75	1.8125	1.875	.90	.80
St. Louis	1.75	1.50	1.75	2.00	1.75	.95	.95
San Francisco	1.875	1.50	1.75	1.50/1.75	1.75	.95	.95
Seattle	1.78	1.48	1.68	2.00	1.78	1.08	1.10
Montreal*f*	.92	.81	.90	.76	.90	.46	.53

b 7 hr. day. *c* Prevailing rate on government work. *e* 30 hr. wk. *f* Effective Nov. 15, 35c weekly bonus added to these rates.



ENR Skilled Average; (Bricklayers, Carpenters, Ironworkers) $1.620
ENR Common Average; $0.869

Streamline
COPPER
SERVICE PIPE

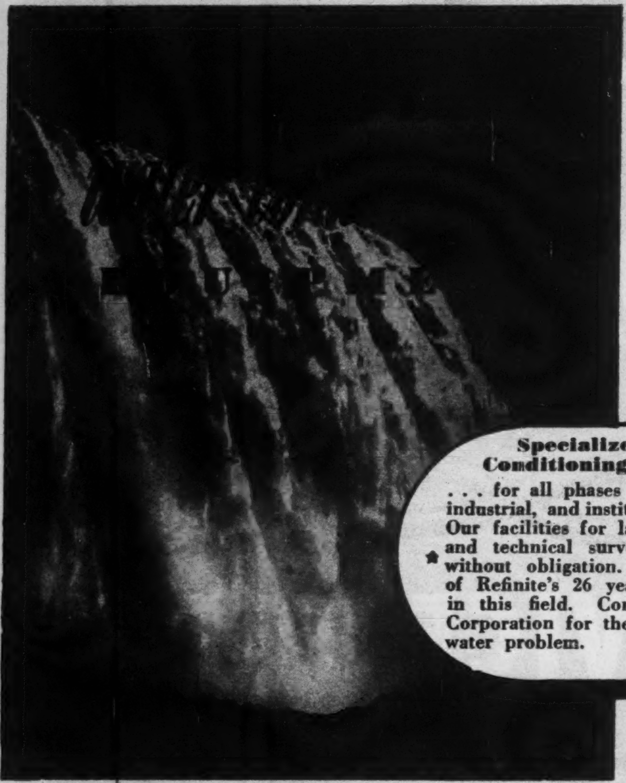
● Many municipalities throughout the country are now making plans for improvements or additions in their water systems for completion after the war is over. STREAMLINE copper service pipe is the ideal material for water service lines and for many applications in filtration plants; in aeration lines and in heating coils using the sludge digestion system in sewage disposal plants—and, of course, for all general heating and piping purposes.

STREAMLINE copper pipe connected with STREAMLINE solder type fittings offers the highest resistance to rust or internal clogging. A service line of this material is vibration proof. Settlement of filled earth or water mains does not fracture it. In fact, copper service pipe is standard material for the great majority of water works throughout the country.

STREAMLINE pipe and fittings are now used 100% in our war effort, but it is our hope that in the near future they will again be procurable for their thousands of peacetime uses.

STREAMLINE copper service pipe is time-tested and reliable. Plan to use it in post-war work.

STREAMLINE
PIPE AND FITTINGS DIVISION
MUELLER BRASS CO.
PORT HURON, MICHIGAN



Specialized Water Conditioning Equipment

. . . for all phases of manufacturing, industrial, and institutional operation. Our facilities for laboratory analyses and technical surveys are available without obligation. Take advantage of Refinite's 26 years of experience in this field. Consult the Refinite Corporation for the solution to your water problem.

THE REFINITE CORPORATION

Write for free catalog *102 Refinite Bldg.* *Omaha, Nebraska*

Big Savings

If you move materials the SAUERMAN way...

Where materials are to be moved distances of several hundred feet or more, a SAUERMAN Drag Scraper or Cableway can cut the cost per cubic yard to a low figure because it is able to dig, haul and place the material in a continuous, straightline operation, doing away with the expense of rehandling. The operation is smooth and rapid, producing large yardage with moderate expenditure of power.

The first cost of a SAUERMAN Machine is reasonable, maintenance amounts to very little, and the simplicity of operation makes it possible to place the control of even the largest installation in the hands of one operator. Moreover, the machine is very flexible, hence easily adapted to the needs of different jobs.

OPERATOR
400 FT. OPERATING SPAN
35 LOADS HAULED PER HOUR

The above picture of a small Sauerman Scraper digging gravel from pit and delivering to crushing plant shows the simple effectiveness of this method. This Sauerman machine uses 4½ gals. of gasoline to move 45 cu. yd. of material per hour.

SEND FOR THIS CATALOG

The Sauerman Catalog pictures and describes many typical projects where materials are being dug, hauled and placed at costs of a few cents per ton. A copy of this useful book is yours for the asking.

SAUERMAN BROS., INC.
532 S. Clinton St., Chicago 7, Ill.

with the new organization are: Arth
E. Gorman, Director, Water Division
Daniel V. McCarthy, Executive Assistant
William D. Williams, Chief, Water Su ply Section; Walter L. Leach, Deput Chief, Water Supply Section; Harvey Howe, Chief, Materials Distribution Se tion; Newton B. Lyle, Deputy Chief, Ma terials Distribution Section.

• • •

Amended scheduling orde assures needed equipmen

In order to expedite construction certain types of building by assuring th equipment is available for installation i time to meet construction schedules, th War Production Board has amended Par 3208 of General Scheduling Order M-29 by freezing manufacturers' productio schedules upon acceptance of contract or subcontracts for the products or th component parts of products needed The freezing order is mandatory. It became effective several weeks ago.

Though numerous of the products affected already came under the order, which is now broadened to include the component parts entering into their manufacture, other products are now included. The freezing order affects only products specified, and then only when they are to be used in connection with the following specified types of construction projects:

Ships, as programmed by the Navy, Maritime Commission and War Dept; advanced and overseas bases as programmed by the Navy; tanks, combat vehicles, and motor transport vehicles as programmed by the War Dept.; power generating plants programmed by the Office of War Utilities; plants designed for rubber production, as programmed by the Office of rubber director; and high octane gasoline plants programmed by the petroleum administrator for war.

These products are added to the freezing order for the first time: various types of fans, blowers and exhausters; certain types of speed-reduction units and unmounted gears; various types of industrial pumps, including reciprocating, centrifugal, rotary, and fluid power hydraulic systems; designated kinds of high pressure blowers, compressors, exhausters and vacuum pumps, including rotary and centrifugal types below 20 hp; various kinds of motors and generators; and oxygen equipment. These are the items which not only have been newly added to the list, but whose component parts also come under the order.

In order to prevent a manufacturer from taking on orders that would interfere with delivery of any of the above products at the time required by the purchaser, the prime contractor or manufacturer must be instructed by a claimant

55 POUND PERFORMANCE

ULLIVA
L-47
Wet, Blower or Dry Type
Standard Chuck 7/8" x 3¼"
Size Air Hose ¾"

EQUIPPED WITH THE

Field reports for the past year have consistently indicated that the Sullivan L-47 rock drill has the drilling speed and power of the average 55-lb. drill. These same reports emphasize that holding qualities of the L-47 are comparable to the average 35-lb. drill.

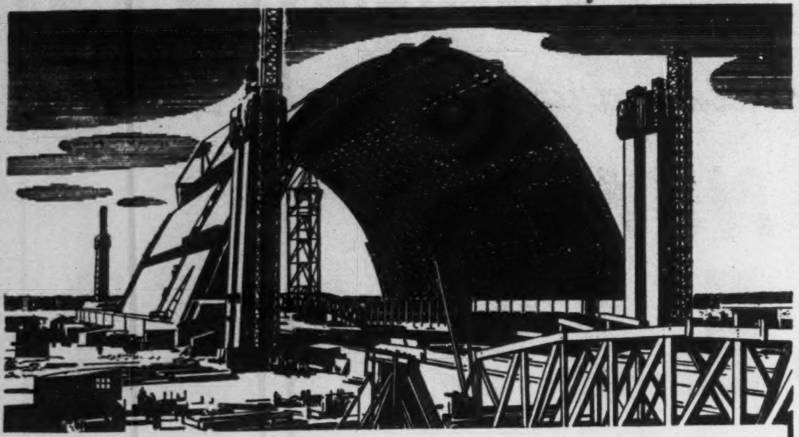
The low maintenance cost of the L-47 has been proved again and again in actual service. Design and construction are similar to the Sullivan L-57, long the outstanding leader of the 55-lb. class.

SULLIVAN MACHINERY COMPANY, MICHIGAN CITY, INDIANA

In Canada: Canadian Sullivan Machinery Company, Ltd., Dundas, Ontario

Manufacturers of: Hand Held Rock Drills • Wagon Drills • Drifters • Detachable Bits • Spaders • Paving Breakers • Plug Drills • Portable and Stationary Air Compressors • Utility Hoists • Contractors Hoists • Scraper Haulers • Loaders • Core Drills • Contract Core Drilling • Oil Well Drills • Coal Cutters

Branch Offices:
Birmingham
Boston
Butte
Chicago
Dallas
Denver
Duluth
El Paso
Huntington
Knoxville
New York
Pittsburgh
St. Louis
Salt Lake City
San Francisco
Scranton
and in Principal Cities Throughout the World



Flame-Proofing Permits WOOD To Invade New Postwar Markets

YOU'VE SEEN this blimp hangar in the news: "Largest Wood Structure in the World." Many like it are scattered along our coast lines, housing the blimps that are making things hot for Axis submarines. But did you know that these wood structures are safeguarded against another enemy, Fire?

MINALITH FIRE RETARDANT protects that wood. It will not catch fire. It will not spread fire. Flame-proofed wood construction is built-in fire control. It helps preserve the usability of a building—a far more important factor than the building itself, especially in wartime. The protection is in the wood; it needs no renewal.

PRESSURE IMPREGNATION with Minalith* fire retardant makes ordinary wood flame-proof. American Lumber & Treating Company employs the same scientific methods, the same accurately controlled equipment, as is used in making Wolmanized Lumber*—the wood that's highly resistant to decay and termite attack.

FOR POSTWAR USE, we now offer you two types of treatment that enable you to retain all of the usual advantages of wood construction—lightness, ease of erection, strength, resilience. We add flame-proofing with Minalith fire retardant or resistance to decay and termites with Wolman Salts* preservative, according to your needs. We'll gladly give you more details on either treatment. Write American Lumber & Treating Company, 1649 McCormick Building, Chicago 4, Illinois.

*Registered Trade Marks

"Alloyed" FOR ENDURANCE

WOLMANIZED LUMBER

agency to place his order for equipment under the freezing-order, and his application must be approved by WPB.

Products which already came under the freezing order, but whose delivery has been delayed because their component parts were not also listed, included rotary and centrifugal pumps of 20 hp and more, and repair and spare parts for those having a value of $1,000 or more; integral horsepower motors; 23 items of power equipment; fire extinguishers; and for shipbuilding: turbines, diesel engines, and marine gears. From now on, sub-contractors making component parts for these items will also be subject to having their production schedules frozen upon acceptance of orders for use in the specified construction projects.

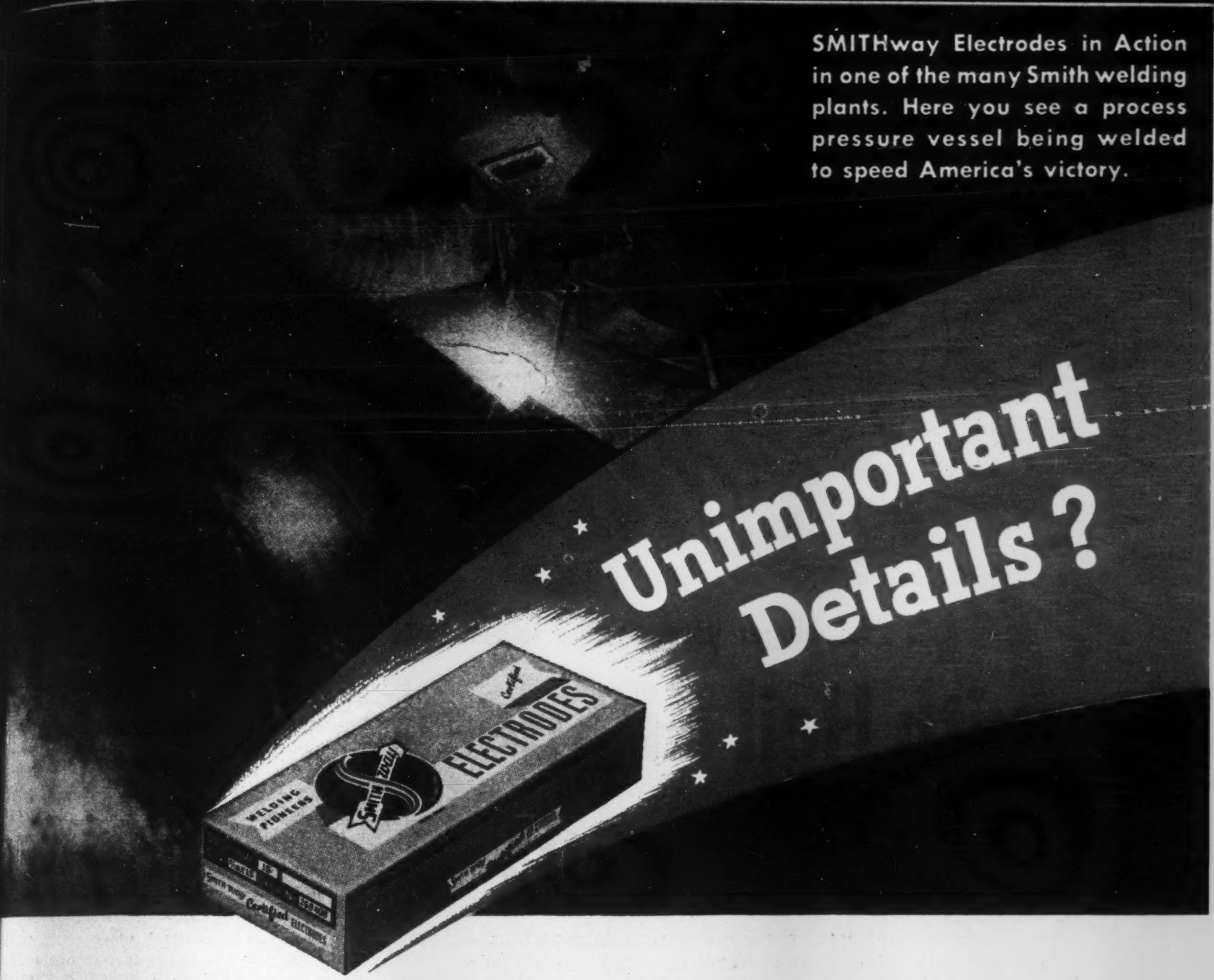
Quoting from the order: "If—the manufacturer with whom the order is placed accepts the same and agrees to ship on the dates specified in the form, then the order automatically becomes part of a 'frozen' schedule—and the manufacturer must schedule his production and make ihs shipments so as to fill the schedule without regard to preference ratings or directions from any governmental agency, except that it may be amended by the War Production Board." If the manufacturer is unable to meet his schedule, he is to make delivery in the sequence required by the schedule.

BRIEF NEWS

Robert J. Ross, city engineer of Hartford, Conn., has announced an award by the New England Sewage Works Association of a first prize to the Hartford Metropolitan District, George H. Craemer, engineer in charge, for its 1942 annual report on the operation of the local sewage treatment plant.

City of Pittsburgh engineers told their city council that to control flash floods simple dredging and some realignment of Saw Mill run would cost $500,000. Flash floods have destroyed protective cribbing and walls. Building of revetment walls and embankments would cost $4,000,000, and complete control of the stream by bottom paving plus some decking-over would cost from $7,000,000 to $11,000,000, city engineers reported. The City Council considered that too costly and decided to consider widening some of the bottlenecks and to police the area against dumping.

Regarding the present status of the Fort Gibson Dam, on the Grand River in Oklahoma, Leo H. Towers, Major, Corps of Engineers, Executive Assistant at Tulsa, Okla., says, "The War Food Ad-



SMITHway Electrodes in Action in one of the many Smith welding plants. Here you see a process pressure vessel being welded to speed America's victory.

There ARE NONE in the manufacture of SMITHway Welding Electrodes!

Why can't we slight even the smallest detail in the manufacture of SMITHway Certified Welding Electrodes? Here's why! It is an everyday occurrence for men in our plants to weld vessels that must withstand working pressures up to 5000 psi!

When welding electrodes must shoulder their share of *that* kind of responsibility, only the best are good enough! That is why we make our own.

If all who make welding electrodes used the electrodes they make, as we do, they would know why our rule book says—"There *are no* unimportant details in the manufacture of SMITHway Certified Welding Electrodes."

That is the kind of dependability we offer you in SMITHway Electrodes. And they can give you what they give us—*better welding results* at lower time and material cost. That can be proved in *your* shops.

Mild Steel . . . High Tensile . . . and Stainless Steel

WELDING ELECTRODES

made by welders . . . for welders

SMITHway Welding Monitor
cuts training time as much as 33⅓%.

SMITHway AC Welding Machine
reduces spatter losses; eliminates arc blow.

SMITHway

A.O. SMITH *Corporation*

MILWAUKEE • WISCONSIN • HOUSTON • TEXAS

Speed-up

.. for bigger yardage and lower costs

...with Heil Hi-Speed Cable Scoops

These big 15-yard tractor scoops are push-loaded in 40 to 50 seconds. They haul at travel speeds up to 20 miles per hour. And that's speed in any language! ... Tilting floor gives positive mechanical pushout from the bowl, spreads loads evenly. The matched tractor-scraper unit accelerates fast — steers without effort, by hydraulic power — turns on a dime — stops safely where you want it, with individual and unit-controlled air brakes. Fast, positive Heil Cable Control of the scoop ... It's an operator's dream — and its extra speed on long hauls often represents the difference between a profit and a loss for you. With this modern equipment, you're the fellow with a reputation for "cutting the mustard". Get in early on post-war waiting list. Write for bulletins.

R-18

THE HEIL CO.

GENERAL OFFICES • MILWAUKEE 1, WIS.

ministration has advised the War Production Board that this project is not believed to be justified at this time on the basis of its food production merits, and it does not appear that the project will be released in the very near future."

Thirteen counties of Arkansas have filed applications with the Arkansas State Highway Commission to obtain emergency federal aid for 28 repair projects for county roads and bridges damaged by last spring's floods, according to an announcement from the highway commission.

The highway department is making a survey of the proposed improvements as the basis for a cost estimate. Three major projects are: the Beaver Bridge over the White River in Caroll County; Lost Bridge over the White River, Benton County, and Higdon Bridge over the Red River, Cleveland County, all of which were destroyed by last spring's floods.

The state of Nuevo Leon, Mexico, has announced completion of the $150,000 irrigation dam "arroyo de Cienega de Flores." This dam, a modern reinforced concrete structure, will make possible the irrigation of 1,000 acres of farm lands in the state of Nuevo Leon.

The consolidation of the Salt Lake City, Utah, district office of the United States Army Corps of Engineers with the Sacramento, Calif., district office, will make the Sacramento headquarters one of the largest in the United States, Col. R. C. Hunter, Sacramento district engineer, says the consolidation was accomplished as part of the program of centralizing corps of engineer activities and to reduce personnel. The Salt Lake district, comprising most of Utah and parts of Wyoming and Colorado, had supervised more than $165,000,000 in military construction.

The Arkansas State Highway Department has obtained 100 percent federal aid for construction of a $338,000 addition to the Arkansas River bridge connecting Fort Smith and Van Buren, it has been announced by officials. The record-breaking river flood of last May cut a new channel on the Fort Smith side of the river. It was necessary to build a new bridge to span this channel to connect with the original bridge. At present traffic is moving over a temporary wooden structure.

Immediate large scale manufacture of trucks and trailers is imperative if America's vast highway transportation system is to be kept in operation, C. T. Ruhf, president of Mack Trucks, Inc., said in a recent interview. Basing his statement on the rapid decline of the nation's stock-e of new trucks, the Mack executive inted out that when truck rationing gan on March 9, 1942, there were ghtly more than 200,000 trucks available for release. As of the second week October of this year there were less n 25,000 trucks remaining in the reve pool, and the number is decreasing pidly. Even if the additional 7,500 cks authorized for production in the ird and fourth quarters of this year e made available, which is considered likely, it is said that the stockpile will arcely last through next January.

The United States Maritime Commison has made public a recent contract arded the Delta Shipbuilding Company New Orleans, La. for the construction 92 additional Liberty ships costing pproximately $165,000,000. A Delta ntract of last spring to build 42 Victry ships, faster than the Liberty ships, s been "rescinded but not cancelled," cording to the maritime commission.

Since the Prairie Farm Rehabilitation ard was set up in 1933, and until the d of 1943, water development projects the three prairie provinces of Canada talled 19,857. Of these 12,167 were Saskatchewan, 5,673 in Manitoba, and 012 in Alberta. They include dugouts, ck watering dams and irrigation procts.

The Houston, Tex., Public Works Deartment has announced the completion the $3,000,000 federally-financed San cinto project to supply water from e San Jacinto River to the war indusies along the Houston ship canal from alena Park to Baytown. The central mping plant on the west bank of the ver supplies water to war industries in is area by means of two canals.

Knoxville, Ten., now sits astride a lake hich was formed by the closing of Ft. oudoun Dam, 22 miles down the Tennese River. A 9-ft. channel now makes ver navigation possible all the way from noxville to the Ohio River. A riveril terminal is being built at Knoxville ith the assistance of TVA.

Two representatives from each of the even municipalities surrounding the city f Toronto, Ont., the reeve and the townip engineer in each case, are to be inited by the City Planning Board to an arly conference. They will meet with e technical advisory committee of the lanning board to prepare and approve a aster plan for the regional development f Toronto and its environs. All planning being done with postwar construction ctivity in view. Ontario's Minister of unicipal Affairs has promised full suport from the provincial government for uch regional planning.

. . . or if it's a Bottom-Dump Trailer Wagon you need . . . this new Heil Unit breaks *all* the speed records

High-clearance doors operate on clamshell principle...

35 inches clearance—with doors wide open — is really something! There are no doors dragging in the dirt — nothing to slow up the unit. The operator turns off the windrow at sharp angles wherever he chooses ... Dumping is under fingertip control ... all in one heap, or with an even spread that looks almost like the work of a cable scraper. Doors are *power-opened* — in 2 seconds — under cable control (they *close* by gravity) ... If you want to see a big smile on your operator's face give him this new equipment to work on ... watch him dump and get away in a flash ... then do a little figuring on what this means to you in dollars and cents and a reputation for clean-looking, on-time completions. Get yourself a *post-war "priority"* by ordering now. Write for bulletins.

Note: Tractor unit can be ordered to operate interchangeably with cable scraper on facing page. R-17

Heil Earth Moving Machinery
Trailbuilders • Bulldozers • Cable Scrapers • Sheepsfoot Tamping Rollers • Hi-speed Wheel Tractor with Semi-trailer Scraper or Semi-trailer Bottom Dump Wagon.

ARMY E NAVY

THE HEIL CO.
GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

Buckets need Care ..

Of all mechanical tools the clamshell bucket gets more banging around than any other tool used by construction men.

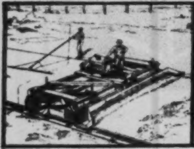
It is called upon to work under the toughest conditions, and to do jobs for which it was not intended.

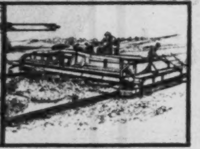
Just a little attention and timely repairs — and your bucket will last its allotted life span.

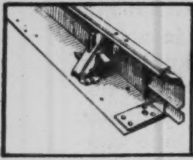
How to care for buckets

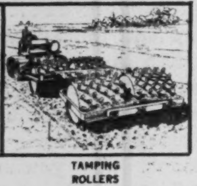
is completely described and illustrated in Blaw-Knox's Bulletin No. 1930, which is all ready to be mailed upon receipt of your request.

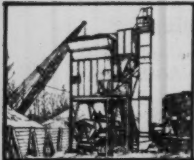
Blaw-Knox Construction Equipment is doing a Vital War Job ......

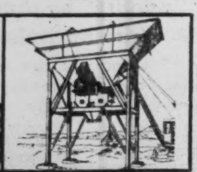

AIRPORT FINISHING MACHINES

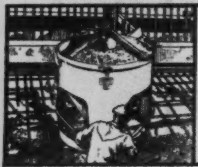

AIRPORT PAVING SPREADERS

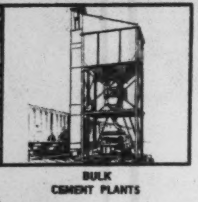

AIRPORT PAVING FORMS


TAMPING ROLLERS


TRUCK MIXER LOADING PLANTS


AGGREGATE BATCHING PLANTS


CONCRETE BUCKETS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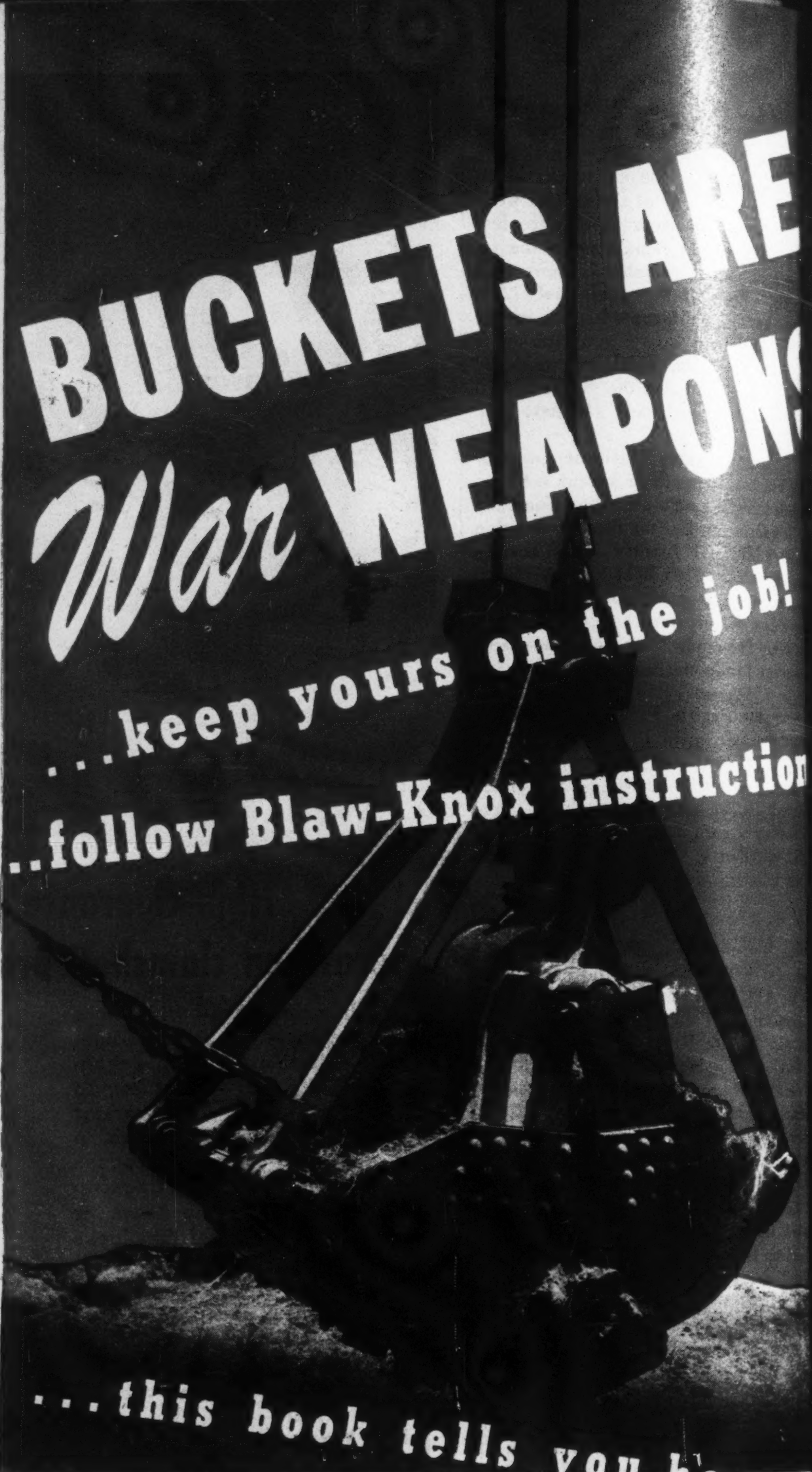
BUY U. S. WAR BONDS AND STAMPS


BUCKETS ARE
War WEAPON
...keep yours on the job!
..follow Blaw-Knox instructio
...this book tells you how

BLAW-KNOX DIVISION of Blaw-Knox Company
2001 Farmers Bank Bldg. Pittsburgh, Pa.

☐ *Send a copy of Bulletin 1930—"Maintenance and Care of Clamshell Buckets"*

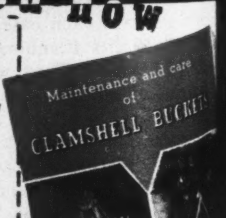
...The Serial Numbers of my Blaw-Knox Buckets are: ________ ________ ________

Company____________________

Individual____________________

Address____________________

City________________State________


Maintenance and care of
CLAMSHELL BUCKETS
BLAW-KNOX DIVISION

NEW AIDS TO THE CONSTRUCTOR

Road Dummy Strip

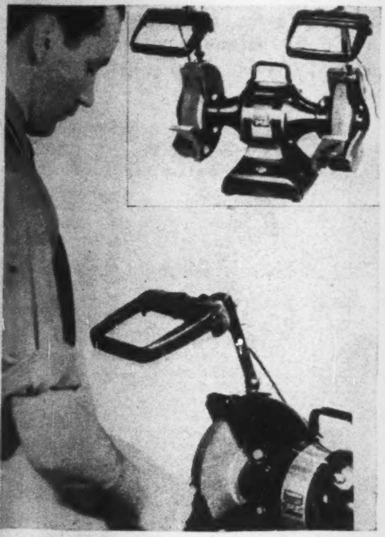
Made with a high degree of rigidity and meeting all federal and state specifications, a new type of mastic board strip for highway dummy joints has been announced. This strip, 1/8 in. thick, is furnished in full size sheets, 36 in. wide, and up to 10 ft. long. The sheet, scored to the required widths (generally 2, 2¼ or 2½ in.) may be taken to the job and strips easily broken off, it is claimed.

This dummy strip is a homogeneous product, and completely waterproof.—*Keystone Asphalt Products Co., 43 East Ohio St., Chicago 11, Ill.*

• • •

Grinder Shield

Safety and better visibility are features of a new model Marvel grinder shield. The shield frame is molded from an impact-resistant plastic material, and electrical parts are in a completely insulated chamber, mounted on an adjustable bracket. The light, operated by a push-button switch, is focused directly on the work.

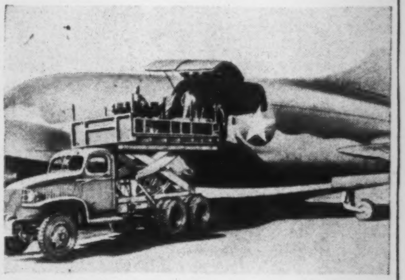


This grinder shield is equipped with a non-shatterable glass window and bayonet-type lamps, which resist vibration and are set in flush with the frame.—*The Boyer-Campbell Co., 6540 Antoine St., Detroit, Mich.*

• • •

Plane Loader

Plane loading is a wartime activity added to the many peacetime uses of Hi-Lift loaders. The latest loader features a spring-counterbalanced tail-gate, which opens manually to any position and prevents damage to the side of the plane.



The Hi-Lift hoist, designed for lifting 8,000 lb., is a mechanical, power-operated type. The body lifts straight up; it may be built to any design or specification.—*Gar Wood Industries, Inc., Detroit, Mich.*

• • •

Compressor Selector

To assist engineers to estimate compressor requirements or to predict performance of present units, a new slide-rule calculator has been devised. While the calculator was designed primarily for use with the firm's own Type GMV compressor, it has been so arranged that it can be used for a compressor of any make.—*Cooper-Bessemer Co., Mount Vernon, Ohio.*

• • •

Rotary Widener

A complete snow-removal job can be done with a new rotary widener, the manufacturer states, because the one machine combines the speed of a push-type plow with the versatility of a rotary.

WYTEFACE
"A"
TRADE MARK
STEEL TAPES

K&E
REG. U. S. PAT. OFF.

I'LL TAKE THE WHITE ONE EVERY TIME!

GRADUATED IN INCHES OR TENTHS

EASY-TO-READ, *raised* black graduations on crack-proof white surface . . . resist abrasion from rock, sand, scraping over rails, pipe, concrete, etc. In all sizes and types—in cases or reels. Ask your dealer—or write for catalog.

EST. 1867
KEUFFEL & ESSER CO.
NEW YORK • HOBOKEN, N. J.
CHICAGO • ST. LOUIS • SAN FRANCISCO • LOS ANGELES • DETROIT • MONTREAL

CONTRACT UNIT PRICES

What contractors are bidding on different kinds of construction work

STREET PAVING, ALBUQUERQUE, N. M.

OWNER: New Mexico State Highway Dept., Santa Fe.; F. M. Limbaugh, state highway engineer.

PROJECT: Grading, minor drainage structures, base course surfacing, bituminous topping, and miscellaneous construction along Gibson Avenue in the city of Albuquerque, Bernalillo County, New Mexico. Approximate length is 2.554 miles.

CONDITIONS: Contractor to furnish all materials and equipment, and complete project in 45 calendar days. Rail transportation facilities available to Albuquerque, and city streets to site of work. Wage rates are: skilled labor, 80c. to $1.50 per hour; semi-skilled, 60 to 80c.; and common, 45 to 55c.

BIDS: Six bids were received September 10, 1943, ranging from the contract low of $38,680 to $60,719.

LIST OF BIDDERS:

1. W. J. Culbertson, Albuquerque, N. M. (contract) $38,680
2. Martin & Cowart, Albuquerque, N. M 41,558
3. Floyd Haake, Santa Fe, N. M 49,805
4. Brown Brothers, Albuquerque, N. M 51,265
5. A. O. Peabody, Santa Fe, N. M 56,311
6. Shufflebarger Trans. & Storage, Albuquerque, N. M 60,719

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation, unclassified	9,344 c. y.	$0.25	$0.60	$0.40
2. Excavation for structures	140 c. y.	1.00	.75	2.00
3. Excavation for pipe culverts	73 c. y.	1.00	1.00	2.00
4. Overhaul	5,500 sta. y.	.02	.02	.005
5. Haul (quarter-mile yards)	83,500 ¼-mi. y.	.03	.035	.01
6. Rolling, steel-tired roller	55 hr.	5.50	6.00	5.50
7. Rolling, sheepsfoot roller	213 hr.	3.75	5.00	5.50
8. Cement concrete pavement spillways	513 s. y.	2.60	4.00	3.00
9. Watering	670 M gal.	1.25	2.00	2.00
10. Class A conc., curb and gutter	14 c. y.	32.50	30.00	25.00
11. Class B concrete	28 c. y.	28.00	25.00	20.00
12. Rl. conc. pipe culv., 24-in. dia., 4½-in. shell	300 l. f.	4.24	4.00	4.50
13. Bracing	10 ea.	2.50	2.00	5.00
14. Galvanised woven wire farm fence	1,810 l. f.	.21	.30	.10
15. Remove and rebuild fence	5,005 l. f.	.18	.05	.12
16. New posts for rebuilding fence	145 ea.	.65	.50	.45
17. Contour ditches	320 l. f.	.05	.10	.10
18. Base course surf., No. 1 aggregate	10,820 ton	.84	.70	1.80
19. Pit run gravel ballast	18,050 ton	.53	.45	.70
20. Mechanical tamping	70 hr.	3.85	6.00	6.00
21. Liquid asphaltic road oil (MC-3)	1,318 bbl.	4.46	4.50	5.80
22. Mixing oil and aggregate	2.508 mi.	275.00	550.00	600.00
23. Seal coating	2.508 mi.	300.00	400.00	300.00
24. Remove conc. curb and gutter	143 l. f.	.50	2.00	1.50

BRIDGE AND HIGHWAY, ARKANSAS

OWNER: Arkansas State Highway Dept., Little Rock; W. W. Mitchell, state highway engineer.

PROJECT: Construction of reinforced-concrete deck girder bridge, grading, drainage structures and concrete paving 0.295 miles of State Highway 64, Section 1, in Sebastian County, Ark. (Fort Smith-Van Buren Road.)

CONDITIONS: Contractor to furnish all materials and complete work in 200 working days. Rail and highway transportation facilities available. Wage rates are: skilled labor, $1.25 per hour; semi-skilled, 75c; and common, 60c.

BIDS: Four bids were received October 1, 1943, ranging from the contract low of $338,741 to $396,195.

LIST OF BIDDERS:

1. Pioneer Constr. Co., Malvern, Ark. (contract) $338,741
2. J. P. McNulty, Pine Bluff, Ark 339,897
3. S. E. Evans Constr. Co., Ft. Smith, Ark 368,396
4. Ottinger Bros., Oklahoma City, Okla 396,195

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clearing	12.2 ac.	$200.00	$200.00	$200.00
2. Grubbing	12.2 ac.	200.00	200.00	200.00
3. Common excavation	4,093 c. y.	.50	.85	.50
4. Dry excavation, structures	635 c. y.	5.00	3.00	2.00
5. Wet excavation, structures	451 c. y.	5.00	3.00	5.00
6. Embankment material	21,339 c. y.	.60	.85	.52
7. Remove old culverts	3 ea.	200.00	150.00	200.00
8. Special compaction, earth	25,432 c. y.	.05	.10	.08
9. Gravel shoulders	548 c. y.	4.00	3.00	3.50
10. Portland cem. conc. pavmt. (9-in.)	5,160 s. y.	4.00	3.50	3.50
11. Reinforcing steel, pavements	4,050 lb.	.10	.06	.10
12. Class S concrete, bridges	3,306 c. y.	26.00	25.00	30.00
13. Reinforcing steel	742,500 lb.	.05	.06	.07
14. Concrete piling	10,352 l. f.	4.00	4.00	4.00
15. Concrete railing	3,087 l. f.	3.00	3.00	5.00
16. Metal bearing and roadway expansion devices	79,500 lb.	.15	.17	.15
17. Class A concrete	0.7 c. y.	50.00	25.00	50.00
18. Class B concrete	3.32 c. y.	50.00	25.00	50.00
19. 30-in. non-rein. conc. pipe culv	68 l. f.	5.00	4.00	5.00
20. Timber guard fence	1,560 l. f.	2.00	2.00	1.75
21. Solid sodding	5,000 s. y.	.40	.40	.40
22. Remove and dispose of conc. pavmt	2,832 s. y.	.40	.60	.40
23. Remove and stockpile exist. lit. surf. crse. and base course	610 s. y.	.40	.60	.40
24. Riprap	13,850 ton	6.00	6.00	6.00
25. Grading	2,660 c. y.	1.00	1.00	1.00
26. Remove exist. bldg. struct. and maintain traffic	Lump Sum	10,000.00	2,500.00	11,500.00

BRIDGE, WEST VIRGINIA

OWNER: State Road Commission of West Virginia, Charleston.

PROJECT: Construction of Muddy Creek Bridge and approaches in Preston County, W. Va. about four miles north of Albright on the Kingwood-Bruceton Mills Road. Work includes construction of three 40-ft. concrete deck girder spans on concrete substructure, and grading, draining, macadam base, and asphaltic concrete surface. Alternates were allowed for concrete or masonry substructure. Award was made on basis of concrete substructure.

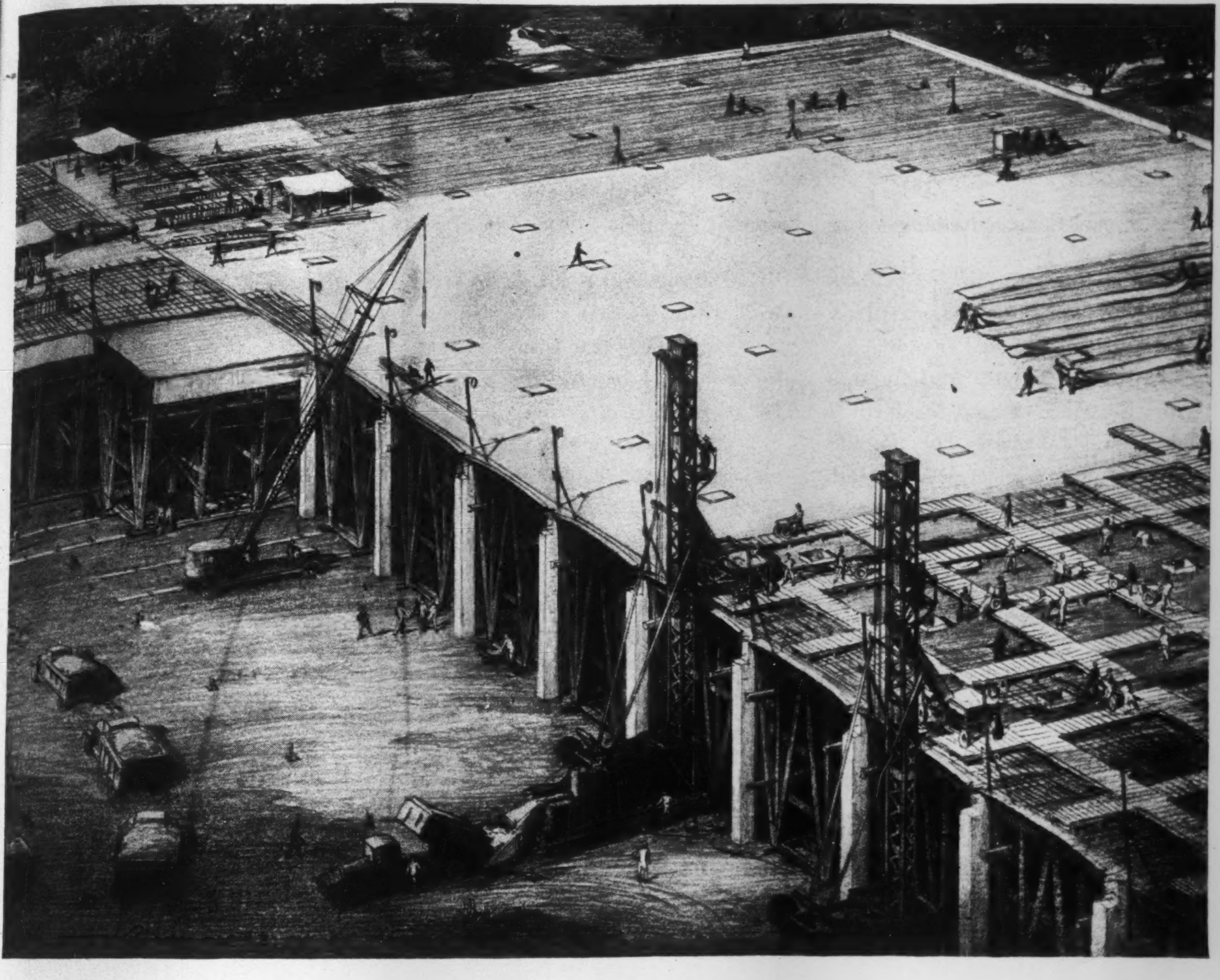
CONDITIONS: Contractor to furnish all materials and complete work in 100 working days. Railway transportation facilities available to Albright, and highway facilities available to site of project. Winter construction methods to be employed as cold weather is anticipated in the mountains where the construction is to be done. Wage rates are: skilled labor, $1.25 per hour; semi-skilled, 80c. to $1.10; and common, 50c.

BIDS: Two bids were opened October 19, 1943, the contract low of $64,831, and $76,350.

LIST OF BIDDERS:

1. Fuccy Brothers, Weston, W. Va. (contract) $64,831
2. J. M. Francesca & Co., Fayetteville, W. Va 76,350

Item	Quan.	Unit Prices (1)	(2)
1. Dry excavation	70 c. y.	$4.00	$3.00
2. Wet excavation	500 c. y.	7.00	10.00
3. Rock excavation	17 c. y.	15.00	12.00
4. Class A concrete, superstructure	237 c. y.	32.00	35.00
5. Class A concrete, substructure	68.1 c. y.	32.00	32.00
6. Class B concrete	254.4 c. y.	30.00	30.00
7. Concrete handrail	257.2 l. f.	5.00	6.00
8. Reinforcement bars	39,285 lb.	.07	.07
9. Dry excavation (alt.)	80 c. y.	....	3.00
10. Wet excavation (alt.)	575 c. y.	....	10.00
11. Rock excavation (alt.)	20 c. y.	....	12.00
12. Coursed stone masonry (alt.)	281.2 c. y.	....	30.00
13. Class A conc., substructure (alt.)	32.4 c. y.	....	32.00
14. Class B concrete (alt.)	66 c. y.	....	30.00
15. Reinforcing bars (alt.)	38,082 lb.	....	.07
16. Malleable iron exp. plates	2,050 lb.	.40	.50
17. Clearing and grubbing	6 ac.	50.00	75.00
18. Unclassified excavation	11,600 c. y.	.75	1.00
19. Borrow	3,978 c. y.	.75	1.00
20. Overhaul	25,000 sta. y.	.02	.05
21. Structure excavation	350 c. y.	3.00	3.00
22. Macadam base course, 8-in	1,500 c. y.	6.50	8.50
23. Limestone prime coat	55 ton	7.00	7.00
24. Asphaltic conc. wearing course	280 ton	12.00	11.00
25. Tar prime	2,300 gal.	.25	.18
26. Limestone seal coat	28 ton	7.00	7.50
27. 18-in. rein. concrete pipe	390 l. f.	3.50	3.50
28. 36-in. rein. conc. pipe	80 l. f.	8.00	8.00
29. Relaid concrete pipe	160 l. f.	1.50	2.00
30. Class B concrete	30 c. y.	35.00	36.00
31. Special rock fill	2,980 c. y.	2.50	3.00



'INCOR' ECONOMIES MULTIPLY IN COLD WEATHER

THIS gigantic warspeed job was concreted with 'Incor' 24-Hour Cement in Summer . . . and the economies were many. Safe stripping without reposting in 24 to 48 hours . . . high-speed, lumber-saving schedule, with only 10% of total area formed . . . acres under roof in 49 days . . . top speed at minimum cost. *Had the job involved Winter conditions, the economies would have been even greater.*

Heat-cured one day, 'Incor' concrete produces 28-day strengths 25% to 30% greater than Lone Star Cement concrete heat-cured 3 days. Even in sub-freezing weather, 'Incor' provides safe stripping strengths with only 24- to 48-hour adequate heat-protection. 'Incor' safeguards against freezing risk . . . cuts costs to the bone. You save 2 to 3 days heating-fuel and labor on each pour . . . need only half as many tarpaulins . . . save overhead through faster job completion.

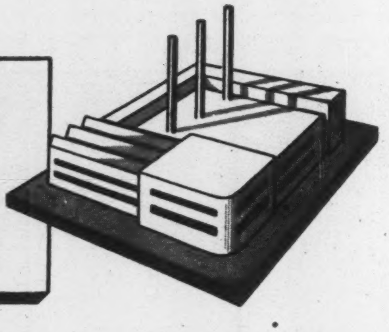
Don't let cold-weather slow job speed down and push job costs up. Use 'Incor' . . . save time, money, worry . . . get strong, durable concrete, as proved by outstanding performance ever since 1927.*

*Reg. U. S. Pat. Off.

LONE STAR CEMENT CORPORATION

Offices: ALBANY · BIRMINGHAM · BOSTON · CHICAGO · DALLAS · HOUSTON · INDIANAPOLIS · JACKSON, MISS.
KANSAS CITY, MO. · NEW ORLEANS · NEW YORK · NORFOLK · PHILADELPHIA · ST. LOUIS · WASHINGTON, D. C.

LONE STAR CEMENT, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS: 15 MODERN MILLS, 25-MILLION BARRELS ANNUAL CAPACITY



IT SIMPLIFIES INDUSTRIAL PIPING JOBS

If you need steel pipe for maintenance or new work in your plant, consider this practical answer:

ARMCO can supply straight pipe in carload lots and cut to specified lengths for fabricating on the site—or better still, prefabricate pipe to your exact specifications. Sizes range from 6 to 36 inches; wall thicknesses from 9/64 to ½-inch. You have a wide selection from which to choose the exact size that meets your structural and service needs.

ARMCO Spiral Welded Steel Pipe is amply strong. It has a uniform wall thickness that makes fabrication easier. Welding is no problem because steel is carefully selected for its welding qualities.

We'll be glad to assist with your special industrial piping problems. Write for the informative, illustrated, bulletin—"6″ to 36″ Pipe for Industrial Uses"—also for quotations and shipping promises. The American Rolling Mill Company, Pipe Sales Division, 2271 Curtis Street, Middletown, Ohio.

Part of a large order of prefabricated and straight ARMCO *pipe awaiting shipment. This is the pipe that makes complicated assemblies go in easily and quickly.*

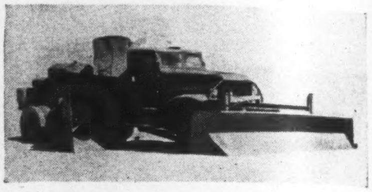
ARMCO

ARMCO

6″ TO 36″ STEEL PIPE

The front end of the widener is a one-way moldboard plow, set at approximately 45-deg. angle, with a clearing width up to 14 ft., designed for straight-line snow discharge beyond the rotary. The rotary unit has a clearing width of 3 ft. 8½ in., and throws a constant stream of snow 75 to 100 ft.

The widener is a completely self-contained and easily removable unit, which is said to give very sharp clearing. The frame structure of the front-end one-way plow is girder type; the hitch is of balanced beam construction of unusual rigidity which delivers strains to push plates at the center of the truck, thus eliminating "jack-knifing." The rotary unit is so placed that the driver always has clear vision, regardless of wind direction, and the reversible chute discharges snow at either side of the highway.—*Wm. Bros Boiler & Mfg. Co., Minneapolis, Minn.*



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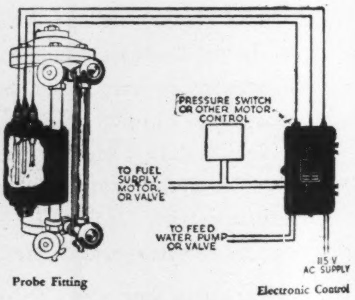
Boiler Feedwater Control

Boiler water levels are automatically controlled, and low-water hazards guarded against, it is stated, by the use of "Fireye" electronic feedwater controls, Series P156N. This equipment, in addition to supplying low-cost control, is simple to operate.

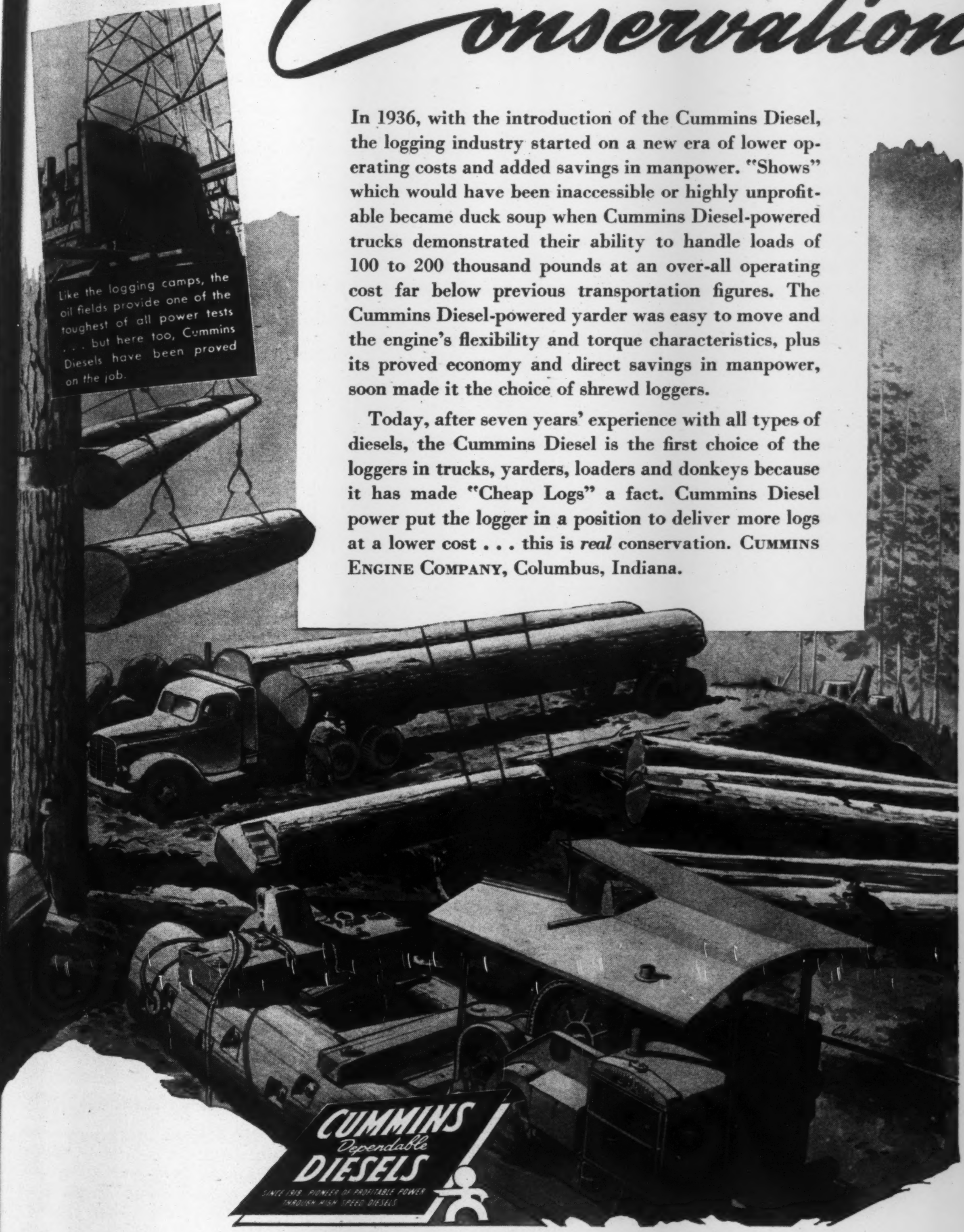
Fireye Type P156N is used with Probe Fitting Type H53, mounted parallel to the water column, or directly on the boiler, and wired to the electronic control. Three probes mark feedwater pump "on" and "off" levels, and low-water danger point. Should water drop below this point, the control shuts off the fuel supply and sounds an alarm.

These controls are supplied as standard for boiler pressures to 300 lb., and


PRESSURE SWITCH OR OTHER MOTOR-CONTROL
TO FUEL SUPPLY, MOTOR, OR VALVE
TO FEED WATER PUMP OR VALVE
115 V AC SUPPLY
Probe Fitting
Electronic Control

Typical FIREYE Installation For Automatic Boiler Feedwater Control And Low-Level Safeguard

cheap logs" is Conservation



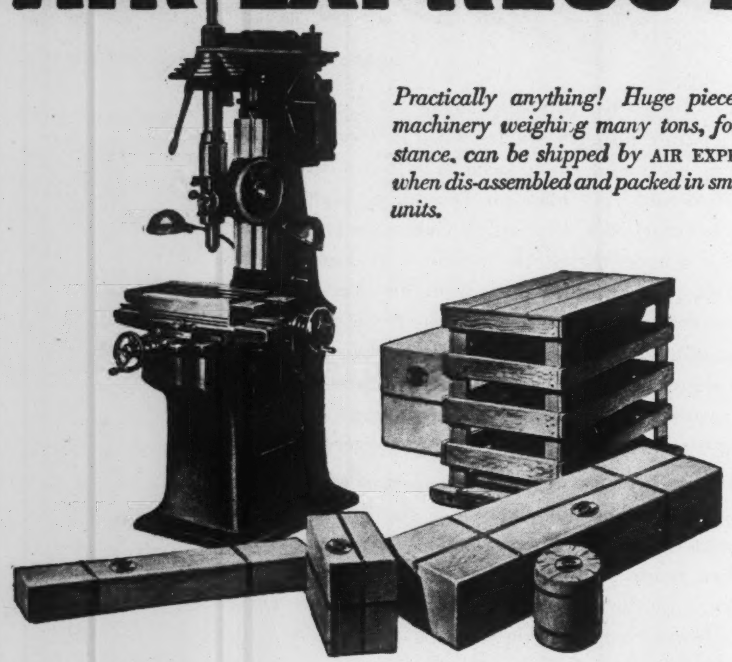
Like the logging camps, the oil fields provide one of the toughest of all power tests . . . but here too, Cummins Diesels have been proved on the job.

In 1936, with the introduction of the Cummins Diesel, the logging industry started on a new era of lower operating costs and added savings in manpower. "Shows" which would have been inaccessible or highly unprofitable became duck soup when Cummins Diesel-powered trucks demonstrated their ability to handle loads of 100 to 200 thousand pounds at an over-all operating cost far below previous transportation figures. The Cummins Diesel-powered yarder was easy to move and the engine's flexibility and torque characteristics, plus its proved economy and direct savings in manpower, soon made it the choice of shrewd loggers.

Today, after seven years' experience with all types of diesels, the Cummins Diesel is the first choice of the loggers in trucks, yarders, loaders and donkeys because it has made "Cheap Logs" a fact. Cummins Diesel power put the logger in a position to deliver more logs at a lower cost . . . this is *real* conservation. CUMMINS ENGINE COMPANY, Columbus, Indiana.

CUMMINS
Dependable
DIESELS
SINCE 1919 PIONEER OF PROFITABLE POWER THROUGH HIGH SPEED DIESELS

What can go by AIR EXPRESS?



Practically anything! Huge pieces of machinery weighing many tons, for instance, can be shipped by AIR EXPRESS, *when dis-assembled and packed in smaller units.*

If your shipment can go by rail, it can usually go by AIR EXPRESS, providing it fits into an Airline Transport (when oversized, the shipment can often be dis-assembled into smaller units).

No special packing is needed, either. In fact, the careful handling so typical of AIR EXPRESS eliminates the need for expensive cases or massive crates.

Consequently, when you pack for AIR EXPRESS, *pack compactly*—thus reducing weight and shipping cost. And for fastest delivery—*ship when ready*—as early in the day as possible.

This 3-mile-a-minute service is available direct to more than 350 U. S. cities and to scores of foreign countries.

AIR EXPRESS RATES REDUCED

As a result of the great volume of Air Express traffic created by wartime demands and the increased efficiency developed to satisfy these demands ...Air Express rates within the United States have been substantially reduced, in some instances as much as 12½%, depending on the weight of the shipment and the distance it moves. Consequently, shippers nationwide are now saving an average of 10½% on air cargo costs.

ASK for our new 1943-44 CALENDAR-BLOTTER. Write Dept. PR-13, Railway Express Agency, 230 Park Avenue, New York 17, N. Y.

AIR EXPRESS
Gets there FIRST

Phone RAILWAY EXPRESS AGENCY, AIR EXPRESS DIVISION
Representing the AIRLINES of the United States

for operation from a supply of 115 to 2 volts AC, 60 cycles.—*Combustion Co trol Corp., 77 Broadway, Cambridge 4 Mass.*

• • •

Drum Opener

Operating on the simple principle of household can opener, a new drum-ope ing tool cuts in one quick, easy thrust, it firmly grips the outside of the barr It cuts smoothly and evenly, it is claime

and folds the cut edges in close to th barrel, thus preventing hand injuries, an permitting re-use of the drum.

This opening tool is made of steel dro forgings; hardened and tempered, it ca be resharpened when necessary.—*Merril Brothers, 36 Caspian St., Maspeth, Brook lyn, N. Y.*

• • •

Wire Tie

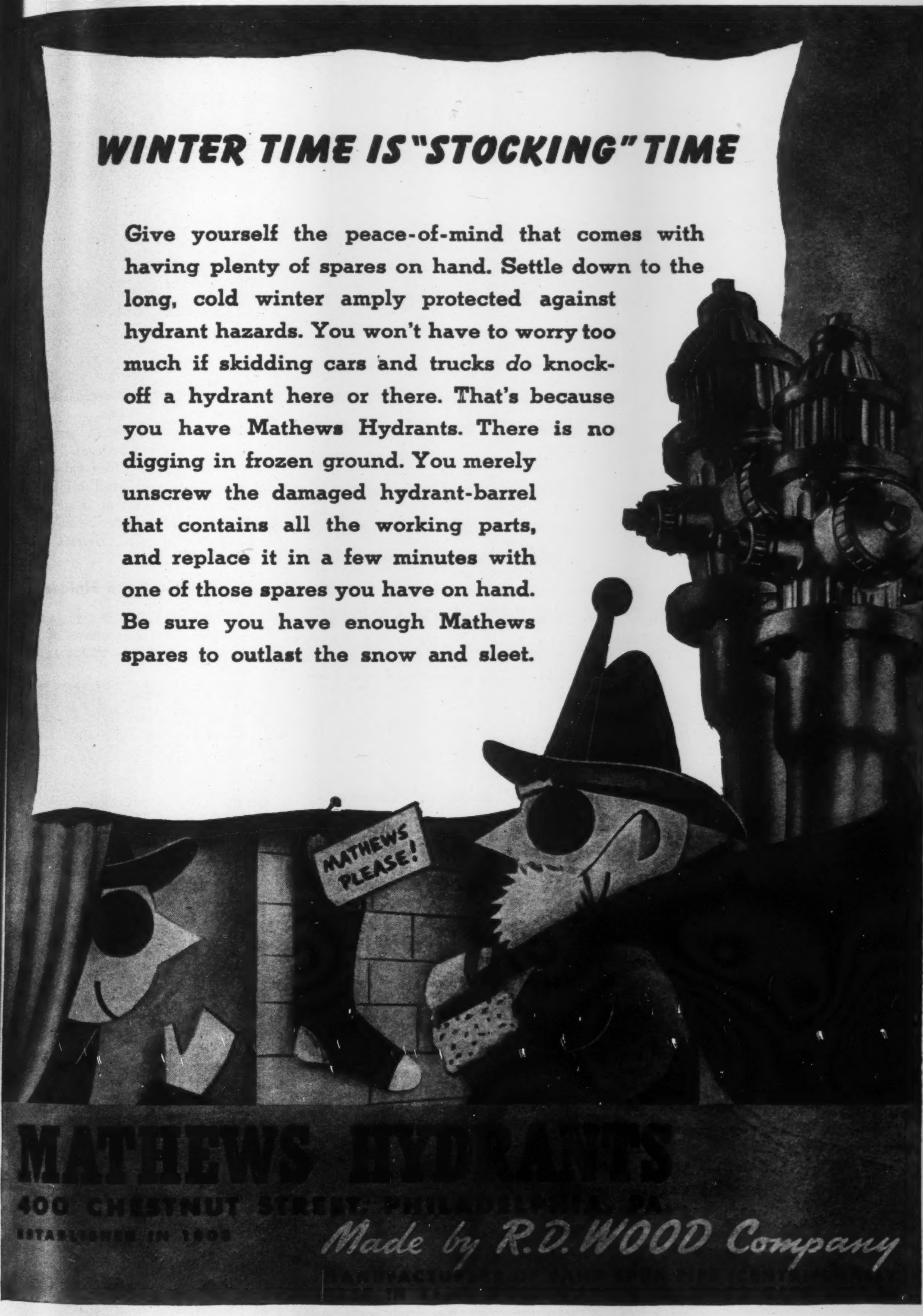
Said to be very fast and economical recently announced wire spreader tie are easily removable for re-use. A quar ter-turn releases the tie, and a stroke o the puller removes it. A patented "Bull dog Grip" spreader releases only afte the concrete is poured.

The ties are available with one or both ends threaded, or with both ends plain for a wide range of wall thicknesses.—*Williams Form Engineering Corp., 46 East Hall St., Grand Rapids, Mich.*

• • •

Turbine Reduction Units

Self-contained and compact, new industrial turbine reduction units are now available in 26½ and 37 hp. base ratings. The former is the output rating of a 4½-in. Cone-Drive center distance unit;


MATHEWS PLEASE!

WINTER TIME IS "STOCKING" TIME

Give yourself the peace-of-mind that comes with having plenty of spares on hand. Settle down to the long, cold winter amply protected against hydrant hazards. You won't have to worry too much if skidding cars and trucks *do* knock-off a hydrant here or there. That's because you have Mathews Hydrants. There is no digging in frozen ground. You merely unscrew the damaged hydrant-barrel that contains all the working parts, and replace it in a few minutes with one of those spares you have on hand. Be sure you have enough Mathews spares to outlast the snow and sleet.

MATHEWS HYDRANTS

400 CHESTNUT STREET, PHILADELPHIA, PA.

ESTABLISHED IN 1803

Made by R. D. WOOD Company

MANUFACTURERS [illegible]

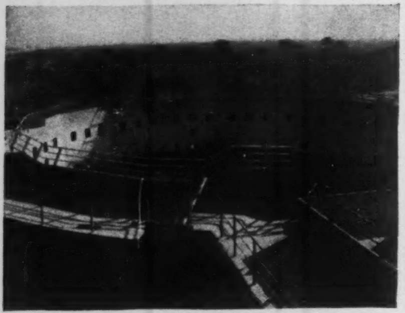
THIS IS THE TOUGHEST TEST

YOUR exacting circular reinforcement jobs go easier and faster, because Clinton Fabric is made UNIFORM in tensile strength of wire and in welding. You are assured of maximum strength and higher performance standards. To get this uniformity every step is supervised by experts in our own plant, from open hearth to wire drawing to welding. The fabric comes in sheets or rolls cut to your *exact* job specifications, saving your time and expense.

CLINTON
Electrically Welded
REINFORCING FABRIC

WICKWIRE SPENCER STEEL COMPANY
500 Fifth Avenue **New York, N. Y.**

MARINE STUDIOS IN FLORIDA



The huge tanks at the Marine Studios, Marineland, St. Augustine, Florida, are made of welded steel and lined with reinforced "GUNITE," which exhaustive investigation has proved to be best adopted for the purpose, due to its strength and impermeability.

Our Bulletin 2200 illustrates and describes a great variety of uses for which "GUNITE" is the one best method of construction. Send for a copy today.

The "CEMENT GUN" can be bought by anyone, and used without restrictions.

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Manufacturers of the "CEMENT GUN"
ALLENTOWN, PENNSYLVANIA

WE ARE ALSO "GUNITE" CONTRACTORS
LET US BID ON YOUR WORK

Our

excellent facilities are available for

BULKHEADS

★

PILEDRIVING

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WHARF CONSTRUCTION

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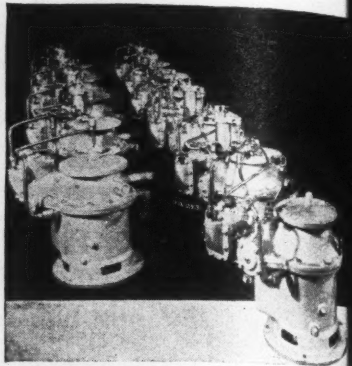
MARINE RAILWAYS

PHONE, WIRE OR WRITE US

DELAWARE BAY SHIPBUILDING CO., INC.
LEESBURG, NEW JERSEY

the larger unit has gears of only 6-
center distance. Both types operate on
put speeds of 5,000 to 6,000 rpm., it



claimed, and have standard ratios ran
ing from 3½ to 8 to one.

These reduction units are equippe
with built-in oil pump and cooler, o
filter and pressure relief valve, pressur
gage, thermometer, and oil level gag
The lubrication system is of the forc
feed type.—*Michigan Tool Co., 717*
East McNichols Rd., Detroit 12, Mich

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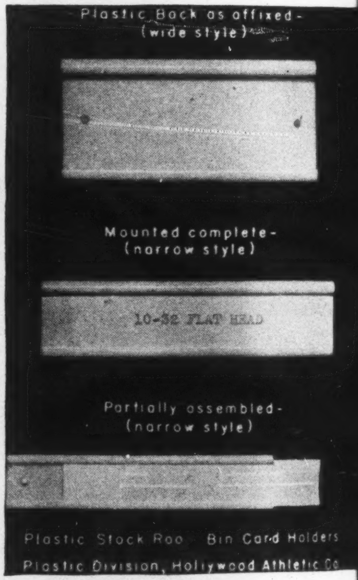
Plastic Card Holders

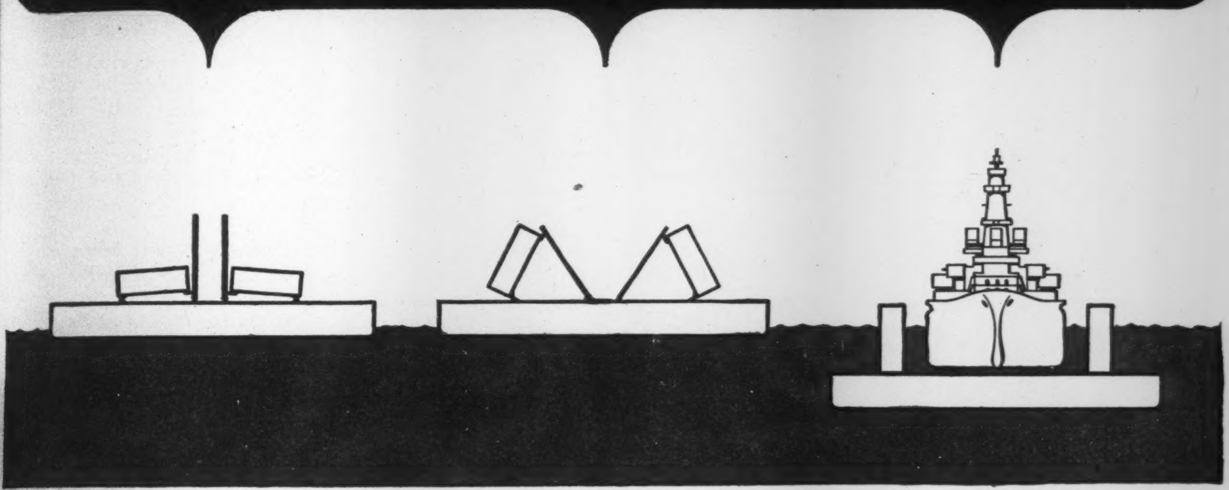
Applicable to any flat surface, a ne
card-holding device consists of a plasti
holder, an insert tab and a transparen


Plastic Back as affixed -
(wide style)
Mounted complete -
(narrow style)
10-32 FLAT HEAD
Partially assembled -
(narrow style)
Plastic Stock Roo Bin Card Holders
Plastic Division, Hollywood Athletic Co

plastic covering sheet. The card holder
may be tacked on wood, or glued to
metal. The material is practically soil-
proof, but is washable in addition.

These card holders, in stock widths of
5/8, 7/8 and 1-$\frac{7}{16}$ in., and stock lengths of
3, 4 or 5 in., are available for immediate
shipment.—*Hollywood Athletic Co., Plastic Division, 211 East 7th St., Los Angeles, Calif.*

Device raises 450-ton walls of floating drydock



In the U. S. Navy's half-billion-dollar drydock program, a device was needed to raise and lower the massive steel wing walls of a new type of mobile floating drydock developed by the Bureau of Yards and Docks. The floating dock, designed for quick repair of vessels damaged in combat, is made up of ten pontoon barges, each capable of supporting 10,000 tons. When bolted together these pontoon barges form a dock 800 ft. long. The walls of the dock are parallel pairs of hinged wings, mounted on the pontoon deck. Weight of each wing: 450 tons.

The problem was the almost unprecedented one of how to raise and lower the heavy wing walls as rapidly as possible.

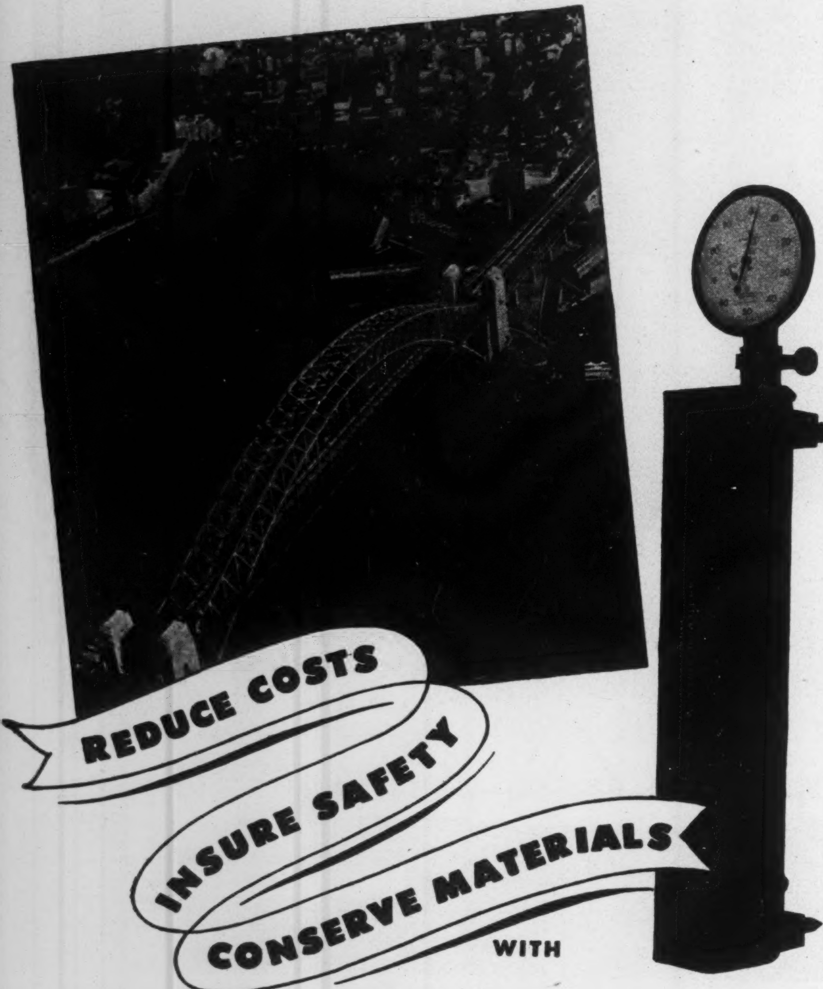
Raising and lowering the wing walls by submerging the pontoon barges was feasible, and had been accomplished, but was slow and expensive. Solution of the problem proposed by Bethlehem, and accepted, was use of 66½ ft. jacking columns, each mounted on a 500-ton hydraulic jack. These columns would raise and lower the wing walls 13½ inches at a time, and hold them at any angle against tension as well as compression.

Bethlehem fabricated, machined, assembled and shipped the nine jacking columns required for the floating drydock, and assigned an engineer and foreman to assist in training crews to operate them. The complete device was designed, built and shipped in less than three months.

In speed of operation, the jacking column device exceeded all expectations. Wing walls were readily raised in the relatively short time of five hours.

★ ★ ★ **BETHLEHEM STEEL** ★ ★ ★

BUY MORE WAR BONDS



WHITTEMORE STRAIN GAGES

The cost of engineering structures can be decreased through a more efficient use of material and the elimination of members which do not carry their share of the load. Safety can be insured by determining whether or not computed stresses are in close agreement with actual stresses.

Whittemore hand strain gages are inexpensive—can be used by observers having little training. With these, stresses in each member of a complex structure can be determined at a reasonable cost. Whittemore strain gages—rugged, simple, and accurate—are available in 2-in. and 10-in. gage lengths. Write for Bulletin 163 describing these and other Southwark strain gages. The Baldwin Locomotive Works, Baldwin Southwark Division, Philadelphia, Penna., U.S.A. Pacific Coast Representative: The Pelton Water Wheel Co., San Francisco.

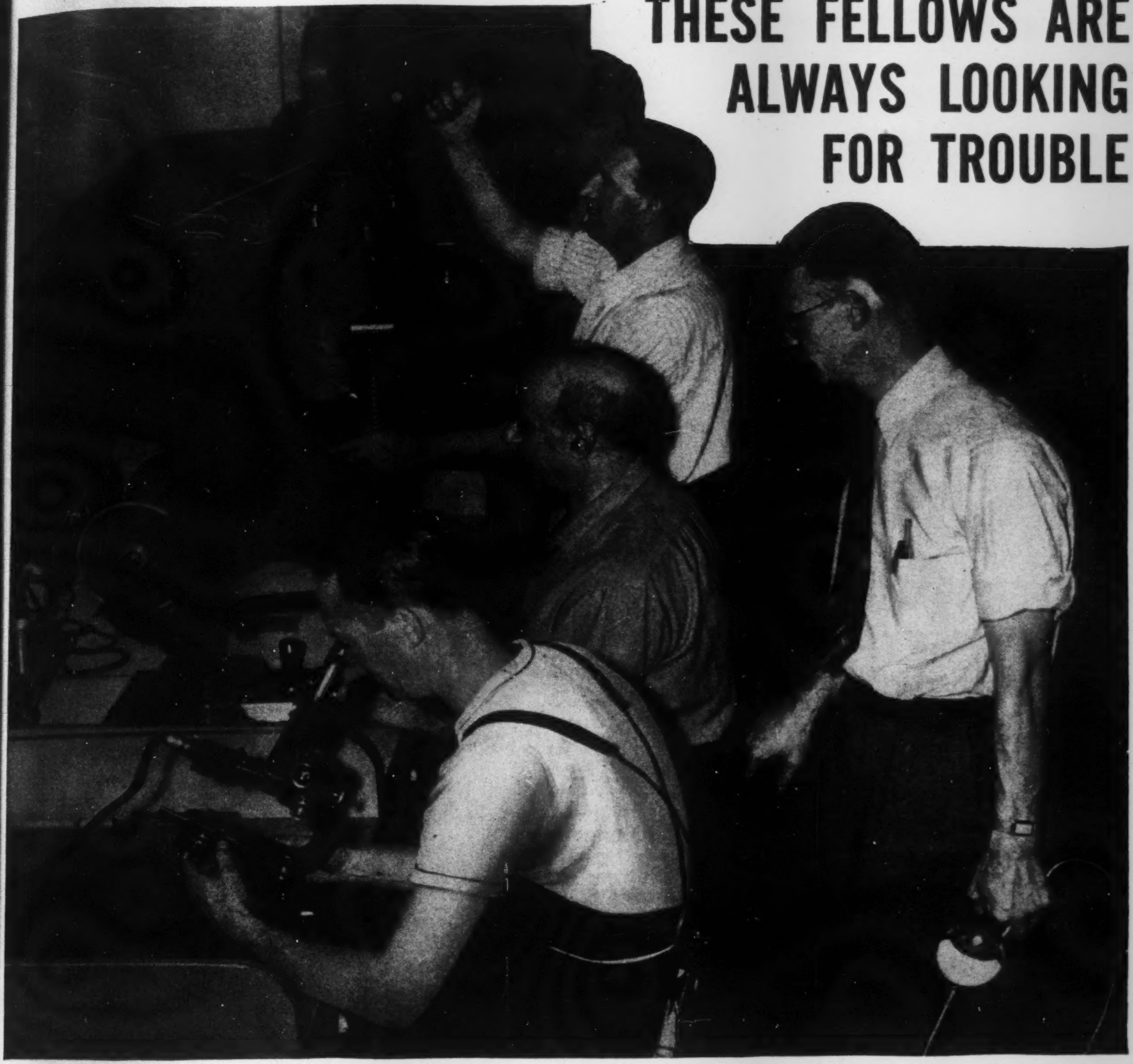
BLH THE BALDWIN GROUP
BALDWIN
SOUTHWARK
TESTING EQUIPMENT

MANUFACTURERS' ACTIVITIES

J. Murray Whitworth has been appointed to the Pittsburgh area as a sales representative of Jenkins Bros., manufacturers of valves. He succeeds John J. Simpson, who resigned to become general sales manager of Pittsburgh Gage & Supply Co. Mr. Whitworth, a graduate of Rhode Island State College, has been connected with the company's Philadelphia branch for the past seven years as a representative in Baltimore, Md., and Harrisburg, Pa. In Pittsburgh he will be associated with L. V. McCune, Jenkins representative there for over 30 years.

Announcement has been made of the appointment of J. M. Darbarker as assistant manager of the Chicago district operations of Carnegie - Illinois Steel Corp., U. S. Steel subsidiary. Charles A. Ferguson, assistant general superintendent of the Gary Sheet and Tin Mills, Gary, Ind., since 1938, is promoted to general superintendent succeeding Darbarker. Mr. Darbarker's promotion follows nine years as general superintendent of the Gary Sheet and Tin Mill. He began his career with U. S. Steel Corp. subsidiaries upon his graduation in 1920 from the University of Michigan with a degree in mechanical engineering. In 1932 he became master mechanic at the Gary Sheet and Tin Mill and served in this capacity until 1933, when he became assistant to the manager.

Mr. Ferguson first became associated with U. S. Steel Corp. subsidiaries in 1913, advancing to the position of assistant general superintendent of the Gary Sheet and Tin Mill in 1938, which position he has held until the present time. He is a University of Michigan graduate with a mechanical engineering degree.



THESE FELLOWS ARE ALWAYS LOOKING FOR TROUBLE

—so they can prevent it! They're the "watch dogs" of our Heat Treating Processes, where good bearings get off to a good start. Theirs is a roving commission, *re*-checking the checking done by the regular inspectors—to make doubly sure each step of the Heat Treatment of Hyatt Roller Bearings produces perfect results.

'Round the clock, 'round the year, they're on the job, looking for trouble—to save *you* trouble. They've worked out a series of continuing tests covering every phase of Heat Treatment. Some are repeated every 15 minutes, others several times an hour—some take only several seconds, others several hours. All are important...as is every test in precision bearing manufacture.

So important, in fact, that one out of every 6 Hyatt employes devotes his time to testing and inspection in various stages of manufacture.

Sound like a lot of work? It is—but worth it when you remember that more than 90% of all Hyatt Roller Bearings made today go directly into fighting equipment or the machinery that helps build it.

That's why we've *got* to make 'em good. Because Victory is our Business.

Hyatt Bearings Division of GENERAL MOTORS CORPORATION, Harrison, N. J.

Pave the Road to Victory with War Bonds

HYATT BEARINGS DIVISION OF GENERAL MOTORS

ADDS UP TO TIME AND MONEY SAVINGS

SUPER-VULCAN OPEN-TYPE
DIFFERENTIAL-ACTING
PILE HAMMERS
18C, 30C, 50C and 80C

As the piles go down get them there in the fastest time with least effort and with savings in cost. Twice the blows per minute does the job. Each blow takes but one quarter to one third the steam. Things to consider are the rugged strength, positive action, and compactness. The open type fits the same leads and uses the same accessories as the VULCAN single acting Pile Hammers.

Sizes
18C—30C—50C—80C
meet all needs

VULCAN IRON WORKS Since 1852
331 North Bell Avenue
Chicago Illinois

H. W. Tenney, formerly assistant director of the Westinghouse Research Laboratories, has been named assistant to Thomas I. Phillips, vice president in charge of the company's Pittsburgh divisions. Mr. Tenney will help coordinate vital wartime engineering activities. He came to Westinghouse in 1920 as a draftsman in the switchboard engineering department at East Pittsburgh. In 1936 he was named manager of the central engineering laboratory department, later becoming engineering manager of the new products division when it was organized in 1937. A year later he was made manager of the engineering laboratories and standards department, holding that position until appointed assistant director of the research laboratories in 1941.

Robert T. Dunlap has been appointed assistant to the president of the Wickwire Spencer Steel Co. Mr. Dunlap is well known in the steel industry as an authority on plant installations, production and operation. Prior to joining Wickwire Spencer, he was general works manager of the Vulcan Iron Works at Wilkes-Barre, Pa., manufacturers of locomotives, marine engines and other products. Under his direction, production capacity was more than tripled with a proportionate lowering of costs and increase in efficiency. Mr. Dunlap has also been associated with the Elliott Co. of Jeannette, Pa., manufacturers of valves, condensers and power plant accessories, as production superintendent; with Jones & Laughlin Steel Corp. of Pittsburgh as engineer, production and general superintendent, and with the Pittsburgh Bridge & Iron Works as plant manager. He will be located at the company's home office at 500 Fifth Ave., New York, 18, N. Y.

Harry Simison Filson, 77, who retired last July as president of the Gilmer Co., a lumber firm of Houston, Tex., died at Houston Oct. 21. Mr. Filson began his lumber career in 1892 as manager of the Alexander Gilmer Lumber Co. mill at Cuero, Tex. He served successively as bookkeeper for this firm in Orange, Tex., as secretary and general manager of the firm's mill that built Remlig, Tex., as builder of the Jasper mill at Jasper, Tex., and as president of the Gilmer Co.

Keep ahead of Schedule with GATKE High-Heat-Resisting Asbestos BRAKE MATERIALS

GATKE Brake Blocks and Frictions

Disc Type Clutch Facings

Cone Type Clutch Facings

How do GATKE Brake Materials speed operations and save money? They keep operating and avoid delays. They pick up and release with smooth, positive, non-grabbing action for faster operation—require fewer adjustments.

GATKE Brake Materials are engineered and service proved for every brake and clutch of Excavating, Road Building and Construction Equipment. Just tell us what you need!

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Brake Lining
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★ Hetherington & Berner asphalt mixing plants, products of the pioneer builder of asphalt machinery in America, incorporate the latest features of design which have been proved in performance. Specifications conform to the most rigid state and city requirements, both as to engineering design and safety regulations. *Write for Bulletin EN-260.*

HETHERINGTON & BERNER INC.
Indianapolis, Indiana

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Hetherington & Berner

ODAY....

and TOMORROW

ow's the time to make plans for your pipelines of rrow ... and to get down in black and white all those deferred municipal improvements and extensions which be started immediately after the war.

planning water supply lines, it's the duty of every nsible official to build the sturdiest pressure lines ble. And, the one sure way to do that is to specify Joint Reinforced Concrete Pressure Pipe. For many , Lock Joint Pipe has been checked and double-ed, proven again and again, even under the most lt conditions, a safe and sound investment. When lling Reinforced Concrete Pressure Pipelines, here's the performance you can depend upon: LOW FIRST COST ... LONG LIFE ... HIGH CAPACITY ... LOW MAINTENANCE ... GREAT STRENGTH ... WATER TIGHTNESS ... SAFETY.

The extensive use of Lock Joint Concrete Pressure Pipe for important mains in principal cities throughout the country and the constantly growing number of repeat orders is abundant proof of the quality of these tailor-made pipelines.

◆ ◆ ◆ ◆

Whether your project is large or small, for the present or the future, your 'phone call, telegram, cable or letter to any of our offices will bring a prompt reply.

LOC

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PRESS PIPE

LOCK JOINT PIPE COMPANY
Established 1905
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SCOPE OF SERVICES *Lock Joint Pipe Company specializes in the manufacture and installation of Reinforced Concrete Pressure Pipe for Water Supply Mains as well as Concrete Pipe of all types for Sanitary Sewers, Storm Drains, Culverts and Subaqueous lines.*

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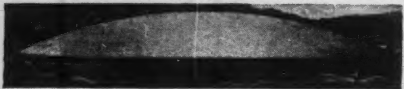
THE patented Preload system of tank construction permits substantial economy in steel and concrete, with consequent savings in cost. Under the Preload system the concrete is permanently maintained in horizontal and vertical compression, thereby completely eliminating cracking or leakage.
Included among the 500 Preload tanks in service are the largest concrete surface tank, largest concrete standpipe, and largest self-supporting concrete dome.

DESIGNERS and BUILDERS of PRELOAD TANKS, ELEVATED TANKS, STANDPIPES, DOMES, PRESSURE VESSELS and CONTAINERS, and CARRIERS of LIQUIDS and DRY CHEMICALS



THE PRELOAD COMPANY

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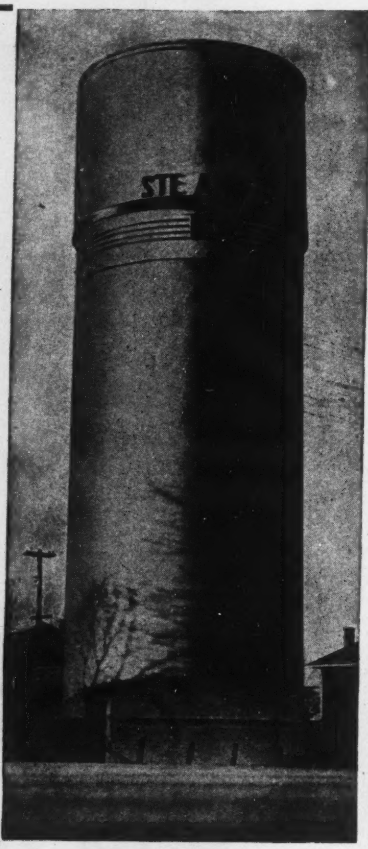

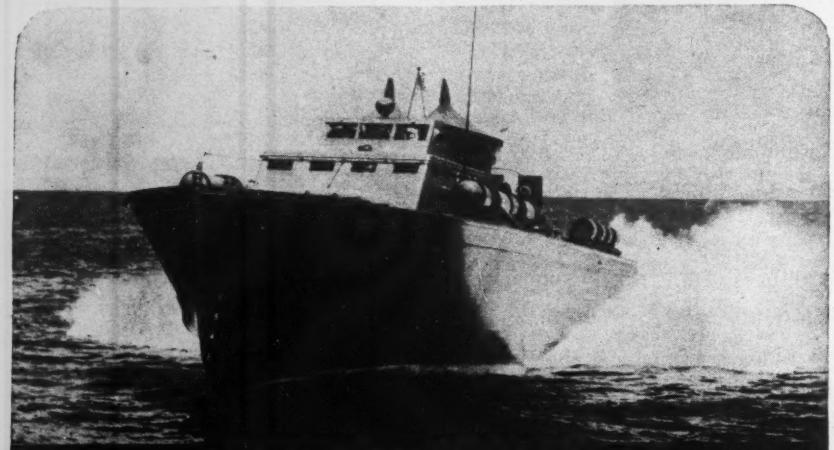

IN PT BOATS, TOO,

plywood is an essential structural material!

● You have read countless news stories and articles about the speed, stamina and striking power of the Navy's torpedo boats. What you may not know is that 3000 square feet of Exterior-type Douglas Fir Plywood go into the construction of each of these famous boats. It's used for decks, deckhouse, bulkheads, fore-and-aft strength members and interior trim . . . jobs for which this Miracle Wood's many advantages make it particularly suited. And it is hundreds of war services like this that are causing architects, engineers, designers and builders to reach one conclusion: *Versatile Douglas Fir Plywood will be one of their most used postwar construction materials.*

● SEND FOR FREE WAR USE FOLDER.
Douglas Fir Plywood Association, Tacoma, Wash.

DOUGLAS FIR
PLYWOOD
•
Real Lumber
MADE LARGER, LIGHTER
SPLIT-PROOF
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STRONGER PER POUND THAN STEEL

NEW TRADE PUBLICATIONS

Timing Motors and Devices—A
of twenty-four pages, illustrated,
descriptions of many of the recent
velopments in the field of timing
neering. Technical data is included
the full range of timing applicati
which will prove helpful to any engi
with a timing problem.—*Haydon M
facturing Company, Forestville, Conn*

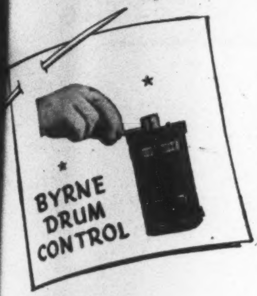
Engineering in Wood—A new 50-
booklet under the above title is profu
illustrated with many of the impor
timber structures of the past two ye
Each structure is identified and descri
and as a result, the booklet presents
most complete story of timber const
tion achievements that has yet appea
in print.—*Timber Structures, Inc., P
land, Ore.*

Pencil Drawings—A portfolio of pe
drawings by Samuel Chamberlain is
off the press. The subjects are buildi
of art and historical importance bom
and laid waste by the Nazis when t
Luftwaffe terrorized unprepared Eu
in the early days of the war. Some of
pictures are of Coventry, Church of
Maclou, Dover Castle, Church of St.
fran, Library of the University of L
ain, The Town Hall, St. Clement Da
Church of St. Laurens, Courtyard in
Temple, St. Peter's Hospital, and
Guildhall.

Each reproduction is free of adve
ing and ready for framing.—*Pencil S
Department, Joseph Dixon Crucible C
pany, Jersey City 3, N. J.*

Straightening and Bending Presse
Thirty-eight pages of descriptive mat
illustrations and tables of work capacit
augmented by engineering tables
other technical data make up this bu
tin. A separate section covers misce
neous straightening and bending pres
—*The Watson-Stillman Co., Rose
N. J.*

Pressure-treated Lumber—A 26-p
guide for engineers in selecting pressu
treated lumber in construction, just p
lished, illustrates installations in gene
construction, farm buildings, highw
and railroads.—*Koppers Co., Wood P
serving Division, Pittsburgh, Pa.*



an this fe do?

This device ... no bigger than the hand that operates it ... harnesses the forces that open huge doors, acres in area and weighing as much as 300 tons.

Built into the door jamb, this little contrivance activates the mechanical brain which Byrne Engineers have created to move these mighty masses--swiftly, smoothly, safely. A flip of the switch does it ... and SAVES OPERATING MAN-POWER, today's critical scarcity.

Yes-and more!

Doors that open whole sides of quarter-mile hangars ... doors that guard the dirigibles nesting along our coasts ... doors that rise, that slide, that tilt ... doors that speed our bomber production ... and doors no bigger than a flivver plane or an army jeep ... all are the normal products of Byrne, an organization attune to the unusual demands of Aviation and Industry.

Two decades of progress and achievement have made Byrne Engineers the most widely consulted civilian authorities on hangar doors in the country. Planners are welcome to the assistance of Byrne.

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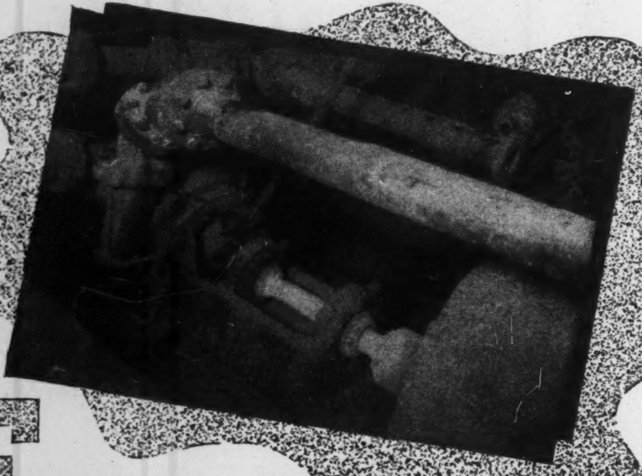
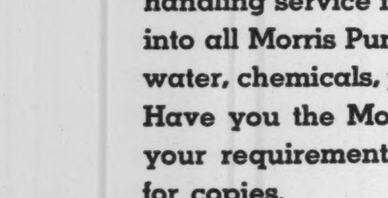
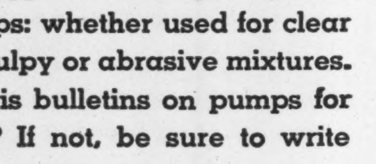


"FULL OF GRIT"

Engineers who have wondered about the origin of this expression may get some idea from the above illustration. This Morris Centrifugal Pump is certainly "full of grit"—literally as well as figuratively. The stamina which has enabled it to operate with complete satisfaction on this difficult slurry-handling service is typical of the quality built into all Morris Pumps: whether used for clear water, chemicals, pulpy or abrasive mixtures. Have you the Morris bulletins on pumps for your requirements? If not, be sure to write for copies.



Heavy-Duty Material Handling Pump



Double Suction Horizontally Split Pump for Clear Liquids

MORRIS
MACHINE WORKS
Baldwinsville, N. Y.

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ESTABLISHED 1864

Export Office:
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New York 7, N. Y.

CENTRIFUGAL PUMPS

MEETINGS

HIGHWAY RESEARCH BOARD, 23rd an meeting, Edgewater Beach Hotel, cago, Ill., Nov. 27-30.

AMERICAN ASSOCIATION OF STATE H WAY OFFICIALS, annual meeting, Chi Ill., Dec. 1-3.

JOINT MEETING, Society for Experime Stress Analysis with Applied Mecha Division, American Society of Mechan Engineers, Hotel Pennsylvania, York, N. Y., Dec. 2-4.

REGIONAL AND LOCAL MEETINGS

VIRGINIA SECTION, AMERICAN WA WORKS ASSOCIATION, 10th annual ference, Hotel Roanoke, Roanoke, Nov. 22-23.

CAROLINAS BRANCH, ASSOCIATED ERAL CONTRACTORS, Pinehurst, N. Dec. 6-7.

ASSOCIATION OF SOUTHERN MICHI ROAD COMMISSIONS, annual meet Lansing, Mich., Dec. 7-8.

N. Y. STATE COUNTY HIGHWAY SUPE TENDENTS ASSOCIATION, Albany, N. Jan. 27-28.

NEW YORK STATE HIGHWAY CHAP 18th annual "victory conference," Witt Clinton Hotel, Albany, N. Y., 8-9.

THE ASSOCIATED EQUIPMENT DISTRI TORS, international association of struction machinery dealers, will its twenty-fifth annual meeting at Edgewater Beach Hotel, Chicago. Jan. 17-20.

SOUTHEASTERN ASSOCIATION OF ST HIGHWAY OFFICIALS, annual meeti Hotel Roanoke, Roanoke, Va., Feb. 9 1944.

MICHIGAN HIGHWAY ENGINEERING C FERENCE, 30th annual meeting, Gr Rapids, Mich., Feb. 8-March 1, 1944.

Elections and Activities

John P. H. Perry has been elected trustee of Brooklyn, N. Y., Polytech Institute.

S. A. Kennedy, retired engineer an member of the board of directors of Metropolitan Water district of Salt L City, Utah, has been elected chairman the board.

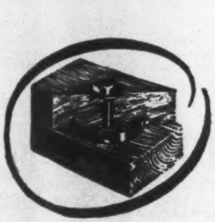
TECO
TECO CONSULTING SERVICE
TYPICAL DESIGNS OF TIMBER STRUCTURES

Structural Engineers and Architects — by the Thousands — are using these TECO SERVICES

Many leading companies and government agencies use Teco services. Upon request, Teco engineers have consulted with the engineers of the Army, Navy, and Maritime Commission, The Austin Company, Chas. T. Main, Inc., the Higgins Industries, Inc., and many others on the preparation of timber designs

You, too, will find the Teco Consulting Service, Design Data Service, Typical Design Service and Research Service of great help in designing and building with timber. Teco distributors and fabricators in all parts of the country * can render helpful services, too. TIMBER ENGINEERING COMPANY — Washington — Chicago — Minneapolis — Portland.

* Firms and addresses supplied on request.



MEMO from the desk of the chief engineer
Frank—
Mail in this coupon
and be sure to
Specify
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CONNECTORS
AND TOOLS

Timber Engineering Company,
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Please send me by return mail a Free copy of *"BUILDING for BATTLE—With the United States Navy."* The story in pictures of the Navy's spectacular use of lumber and timber during the Second World War.

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YOUR TUNNEL LINER
Is a "Patriot" Too

(PHOTO BY U. S. ARMY SIGNAL CORPS)

Old, familiar friends have taken new shapes and gone to war. Now ARMCO Tunnel Liner Plates can be purchased only for the most vital war-time projects.

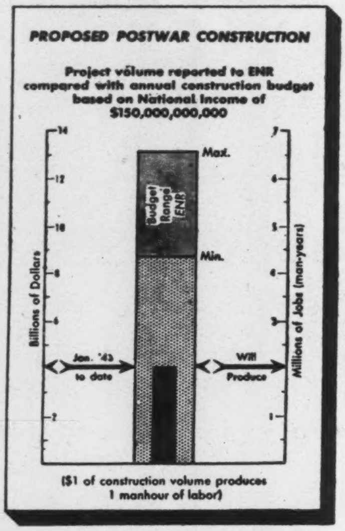
Where metal tunnel liner *must* be used, ARMCO Plates are doing their part and more. They save precious metal because gage for gage this heavy duty liner is stronger (section modulus) than any other plate. Less metal is required to do the work. When completed rings can be spaced to take advantage of partly self-supporting ground, fewer plates may actually be used. Work moves fast; for one man can handle and assemble the light sections with structural wrenches.

If you cannot get ARMCO Tunnel Liner Plates, remember the steel is going into tanks, guns and ships—helping to win battles. After the war these liner plates will be back to help you cut costs and speed tunnel work. Armco Drainage Products Association, 115 Curtis St., Middletown, O.

ARMCO

ARMCO
TUNNEL LINER PLATES

POSTWAR PROJECTS



Projects proposed for postwar construction have been published in these columns since January, 1943 as they have been reported to Engineering News-Record.

The chart above shows, both in estimated dollar volume and in jobs or man-years of labor, how fast this reservoir of future work is filling up.

If you or your community are working on projects that have not yet been included in this "postwar reservoir," please send us an itemized list and description of them, including estimated cost and the names of the engineers who are at work on the plans. Then as you watch the arrows climb you will know that you and your community are contributing to the success of the NUMBER ONE JOB of preparing for peace.

Address your projects list to Manager, Business News Department, Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

MINIMUM SIZE OF PROJECTS PUBLISHED

Public Works	$25,000
Industrial Buildings	40,000
All Other Buildings	150,000

WATERWORKS

★**Conn., Norwalk**—City First Taxing Dist., City Hall, 600 m.g. water supply reservoir, 600 ft. long, 80 ft. deep. $600,000.

★**†Georgia and South Carolina**—U. S. Eng., 512 Spring St. N.W., Atlanta, Ga., Clark Hill reservoir. $28,000,000.

Ind., New Albany—Bd. Trustees Southern Indiana Tuberculosis Hospital, J. V. Pace, supt., water tower. $15,000.

Ind., Plainfield—Bd. Trustees Indiana Boys' School (Correctional), E. Millard Dill, supt., watermains. $30,000. John M. Rotz Eng. Co., 804 Merchants Bank Bldg., Indianapolis, engr.

★**Kan., Kansas City**—Bd. Pub. Utilities, c/o Chas. A. Lowder, secy., 2 reservoirs, settling basins, $1,395,000. Burns & McDonnell, 107 W. Linwood Blvd., Kansas City, Mo., engrs.

La., Abbeville—Town Council, water filtration plant. Wm. R. Burk, Associated Architects & Engineers, 502 Pan American Bldg., New Orleans, archts.

★**Mass., Lynn**—City Water Dpt., City Hall, water supply sys., storage and distr. facilities, incl. standpipe. $1,035,000.

★**Neb., Omaha**—Metropolitan Utilities Dist., 18 and Harney Sts., water sys. expansion, imprvs., incl. elevated storage, addnl. pump. stations, water softening, filtering plant, exten. mains, more fire hydrants, replacing old mains. $5,000,000. D. C. Detweiler, city water engr.

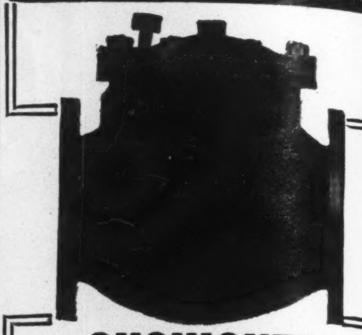
★**N. J., Bloomfield**—Town, Municipal Bldg., replacing obsolete watermains, $1,000,000.

★**N. J., Orange**—City, City Hall, imprv. water supply sys. $875,000.

N. Y., Greenburgh—Town and Westchester Co., White Plains, pump. station, Fairview. $65,000.

N. Y., Mount Kisco—Village and Westchester Co., White Plains, imprv. water sys. $42,000.

GOLDEN-ANDERSON



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SWING CHECK
VALVES

Sensitive, balanced operation is obtained in the G-A Cushioned Swing Check Valve with a special cushioning chamber which prevents slapping or banging of the disc on return-flow.

This valve is supplied in 4" to 36" sizes . . . in materials best suited to your specific needs.

Write for your copy of the latest G-A Catalog *today.*

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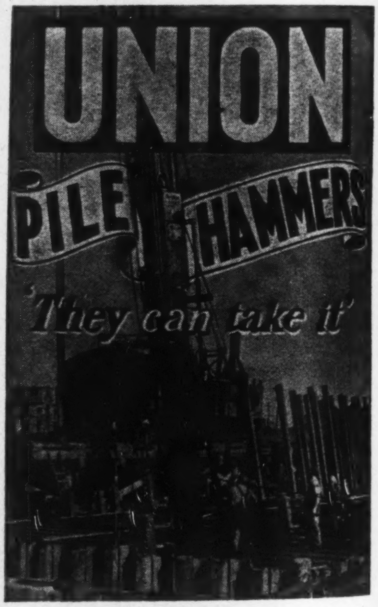
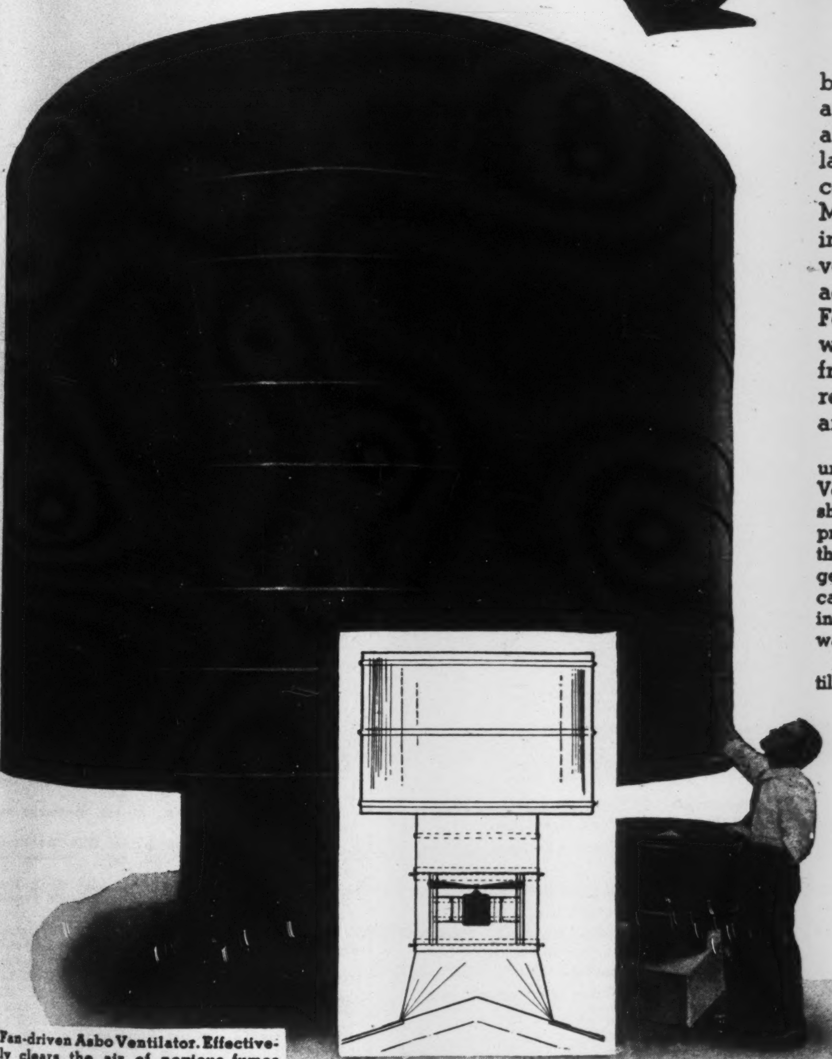


Ready!—for quick reference and ALL FACTS on what UNION makes for speedy plant construction—write or wire NOW for Catalog 184E.

EST. 1900
Union Iron Works, Inc.
ELIZABETH, New Jersey

THIS GIANT *Asbo* VENTILATOR REMOVES FURNACE GASES FROM INTERIOR OF STEEL PLANT



Fan-driven Asbo Ventilator. Effectively clears the air of noxious fumes from a furnace room, the ventilation of which was regarded as extremely difficult. Inside dimension of base ring, 96 inches; rated capacity when gravity-operated (without fan) under a 5-mile wind, 35,000 cubic feet per minute; equipped with 15-horsepower motor-driven fan, 100,000 cubic feet per minute.

Through the 96-inch throat of the big round Ventilator here shown, accelerated by a 15-horsepower fan, a hundred thousand cubic feet of gas-laden air is expelled, under average conditions, every working minute. More than forty feet in overall height, including fan barrel and base, the ventilator is thoroughly protected against the elements by the use of Felt Cote Asbestos Protected Metal, which is bolted to structural steel framing members, and is designed to resist wind pressures of ninety miles an hour.

This towering air valve, assembled, was too unwieldy for shipment. Yet, like all Asbo Ventilators, it was completely set up in the shop, to make certain that every part was precisely fitted according to design. It was then taken down and carefully prepared, together with others of like dimensions and capacity, for transportation to its destination in a West Coast steel mill. Shipping weight was 5½ tons.

Either gravity-type or fan-driven Asbo Ventilators of various sizes and capacities can be shipped from stock or fabricated speedily from materials on hand. Competent engineering service and adequate shop facilities assure this performance. Installation will be promptly made by thoroughly trained crews.

Learn about the superior efficiency of Asbo design—the long service of Asbestos-Protected Metal Ventilators—the availability of other materials for special conditions. Send us rough drawings or description of roof, giving pitch, etc. Let us know your ventilating problem. We will submit proposals by mail or will send a representative if desired.

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POSTWAR PROJECTS (Cont'd.)

N. Y., Solvay—Village Bd., J. J. Degan, mayor, reinforcing and concreting water reservoir, $42,300; watermain extens., $50,000.

★**O., Dayton**—City, F. O. Eichelberger, city mgr., Municipal Bldg., water-softening plant with 72 m.g. daily capacity. $1,800,000. Alvord, Burdick & Howson, 20 N. Wacker Dr., Chicago, Ill., engrs.

O., Coshocton—Bd. Comrs., Coshocton Co., imprv. WW sys. $50,000. K. H. Kinkley, Coshocton, co. engr.

O., Painesville—Bd. Comrs., Lake Co., pump station, water storage tank, installing watermains, $319,600. A. B. Wilson, Painesville, co. engr.

★**Pa., Pittsburgh**—City, Dpt. P. Wks., City Hall, water imprvs., 221 projects. $4,719,500.

R. I., Greenville—Northwestern Water Co., Greenville, water sys., storage and distr. facilities. Over $15,000. Fay, Spofford & Thorndike, 11 Beacon St., Boston, Mass., engrs.

Wis., Two Rivers—City, A. O. Allie, clk., City Hall, filtration plant addn. $200,000.

★**Alta., Edmonton**—A. Russell, city clk., City Hall, water purification plant, $942,000; waterworks distr. sys., $715,000. W. R. Mount, c/o owner, engr.

★**B. C., Victoria**—City, watermain, $2,000,000; ruck tunnel for water from Sooke, $1,000,000; imprv. water distr. sys., $250,000.

N. B., Sussex—Municipality, H. Jonah, clk., direct water line from filtration plant to reservoir. $35,000.

Ont., Port Colborne—Municipality, WW sys. extens. $100,000. C. E. Grassie, Town Hall, engr.

SEWERS & WASTE DISPOSAL

★**Calif., Oakland**—City, City Hall, storm sewer for 105 Ave., $240,000; storm conduit on 8 Ave. from Clinton Basin to Foothill Blvd., $171,892; storm sewer in 23rd Ave. from Estuary to E. 17 St., $130,343. W. Frickstad, city engr.

Calif., Stockton—San Joaquin Co., Court House, drainage sys. in East Stockton, bounded by City and Diverting Canal to provide relief from storm water, $40,077.

Ind., Garrett—City Council, F. L. Feick, mayor, City Hall, sewage disposal plant, sewers. $205,000.

Ind., Pendleton—Bd. Trustees Indiana State Reformatory, A. F. Miles, supt., sewage disposal plant imprvs. $25,000. Bevington-Williams, Inc., 730 Ind. Pythian Bldg., Indianapolis, consult. engr.

Ind., Plainfield—Bd. Trustees Indiana Boys' School (Correctional), E. Millard Dill, supt., sewage disposal plant, sewer imprvs. $70,000. John M. Rotz Eng. Co., 804 Merchants Bank Bldg., Indianapolis, consult. engr.

Ind., Valparaiso—Bd. P. Wks., G. D. Conover, mayor, City Hall, sewage treatment plant. $100,000.

Ind., Vernon—Bd. Trustees Muscatatuck State School for Feeble Minded, M. N. O'Bannon, supt., remodeling sewage treatment plant. $65,000. John M. Rotz Eng. Co., 804 Merchants Bank Bldg., Indianapolis, mech. engr.

Ia., Mason City—Pearl Kellogg, city clk., City Hall, sanitary sewers. $60,000. M. E. Riley, city engr.

Ia., Spencer—City, M. M. Moulton, clk., City Hall, garbage incinerator, storm sewers. $30,000. L. Schoel, Spencer, engr.

★**N. J., Millburn**—Town, Town Hall, drainage sys. in localities of Glenwood $50,000, South Mountain $45,000, Berkeley $22,000; sanitary sewer in Knollwood Sect., $600,000.

N. J., Orange—City, storm drainage sewers. $360,000.

N. Y., Bedford—Town and Westchester Co., White Plains, sewerage sys., Katonah and Bedford Hills. $350,000.

★**N. Y., Buffalo**—City Council, J. J. Kelly, mayor, City Hall, incinerator repairs, $800,000.

N. Y., Eastchester—Town and Westchester Co., White Plains, incinerator addn. $45,000.

N. Y., Hawthorne—Village and Westchester Co., White Plains, sanitary sewers. $450,000.

★**N. Y., Jamestown**—City, Dpt. P. Wks., City Hall, sewerage sys. imprvs., extens., etc. $950,000. Metcalf & Eddy, 1300 Statler Bldg., Boston, Mass., consult. engrs. CD 2/1—ENR 2/4.

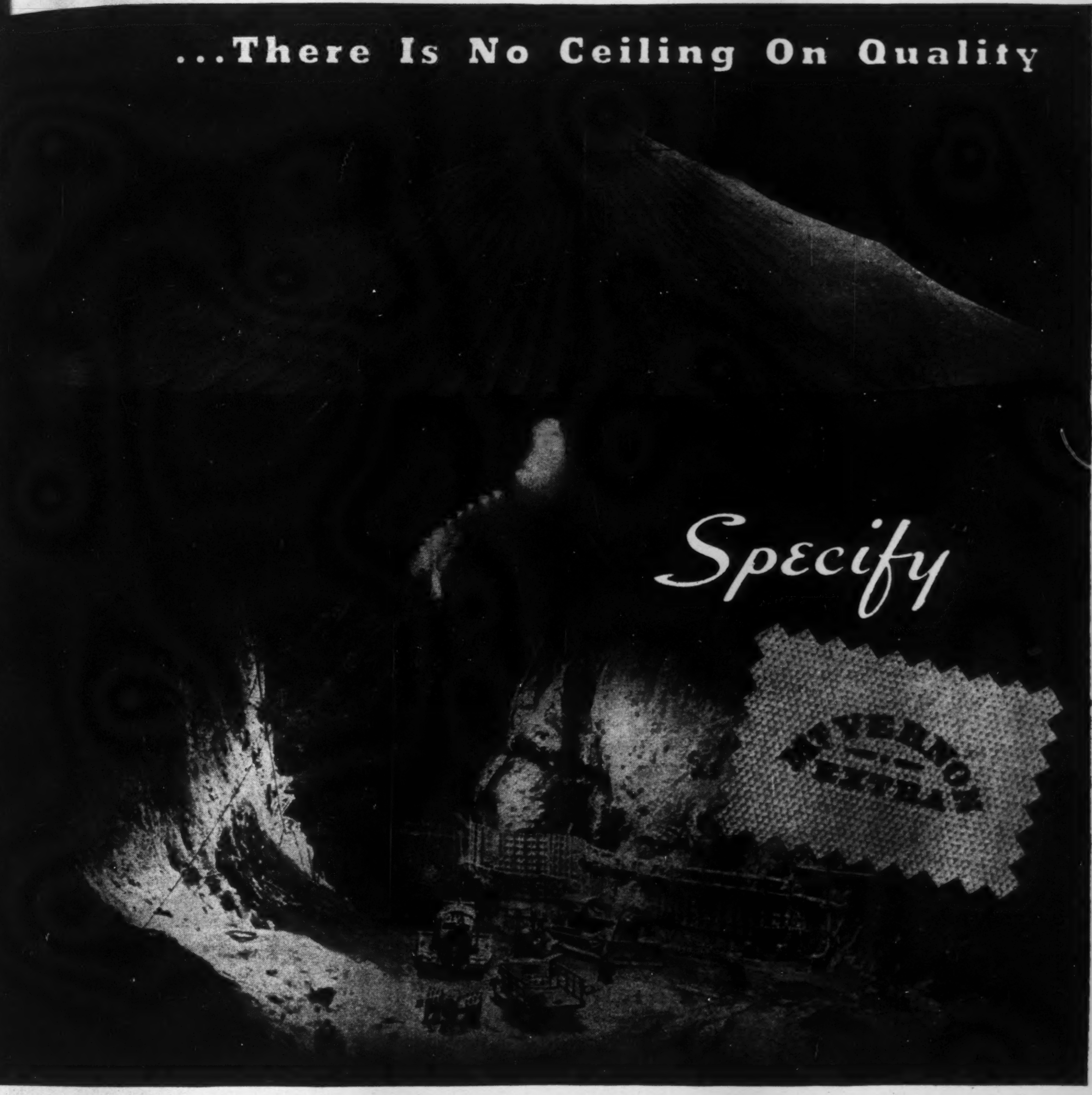
N. Y., Pleasantville—Village and Westchester Co., White Plains, sewers. $103,000.

N. Y., Solvay—Village Bd., J. J. Degan, mayor, City Hall, sewage disposal sys. $140,000.

N. Y., Thornwood—District and Westchester Co., White Plains, imprv. district sewers. $315,000.

N. Y., White Plains—City and Westchester Co., White Plains, lateral sewers, West St., $48,000; Randall Brook Storm water drain, $178,000; storm drains Rose St., $196,000; many drains and sewers.

N. C., Raleigh—G. Andrews, mayor, City Hall, sewage disposal sys.



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POSTWAR PROJECTS (Cont'd.)

O., Hamilton—City, R. P. Price, mgr., City Hall, exten. storm and sanitary sewerage sys. Over $25,000. A. A. Smalley, city engr.

O., Medina—Bd. Comrs. Medina Co., miscellaneous sewers, $30,000. C. H. Bricker, Medina, co. engr.

★**O., Painesville**—Bd. Comrs. Lake Co., sanitary trunk sewers, $719,775; lateral sanitary sewers, $789,000. A. B. Wilson, Painesville, co. engr.

O., Salem—City, storm and sanitary sewers. $100,000.

★**Pa., Pittsburgh**—City, Dpt. P. Wks., City Hall, sewer construction and reconstruction, $4,900,000; addnl. incinerator, $530,000.

R. I., Wallum Lake—State Dpt. Social Welfare, 40 Fountain St., Providence, brick, concrete incinerator exten., new equipment. $25,000.

★**Tex., Houston**—J. N. Edy, city mgr., City Hall, storm sewers inside city limits on new proposed Houston-Galveston super-Hy. $950,000. CD 6/17—ENR 6/24.

Tex., Texarkana—S. H. Atkinson, mayor, City Hall, sanitary sewer exten. $250,000.

B. C., Victoria—City sewers. $100,000.

N. B., Shediac—Municipality, installing sewerage sys. $60,000.

Ont., Port Colborne—Municipality, sewer extens. $150,000. C. E. Grassie, Town Hall, engr.

Que., Laval Des Rapides—Municipality, P. E. Demers, clk., sewers. $50,000.

★**Ont., Sarnia**—Miss M. D. Stewart, city clk., City Hall, sewers in various streets, $950,000; sewage disposal plant, $600,000. C. T. Laidlow, c/o owner, engr. CD 10/20—ENR 10/28.

BRIDGES, GRADE CROSSING ELIMINATION

Calif., Bakersfield—City, City Hall, overpass on 21 St., above Union and Golden State Hy., $214,850; overpass at Sonoro St. and the Southern Pacific R. R. between Kentucky and E. 21 St.; overpass at Chester Ave. at Santa Fe R. R. J. Holfelder, city engr.

Calif., Merced—Merced Co., Court House, 50 concrete bridges, replacing wooden ones at various locations throughout county. $125,000.

★**Calif., Stockton**—San Joaquin Co., Court House, grading, paving, draining street and constructing bridge over Mormon Channel to connect Ophir & Sharp's Lane, Stockton, $41,000; replacement of Benson Ferry drawbridge on Thornton Rd., about 2 mi. northwest of Thornton, $163,649; bridges over Grant Line Canal and Old River & Short approach roads on Tracy Island Rd., 5 mi. north of Tracy, $254,414; bridge over Mokelumne River on State Route 88, near Clements to Hoskins Rd., $159,177.

Calif., Stockton—San Joaquin Co., Court House, bridge over Mokelumne River on Walnut Grove Rd. between Thornton and Walnut Grove and 4 mi. west of Thornton, $172,605; bridge over Mokelumne River on Lockeford-Acampo Rd. and ½ mi. new road to bridge 1 mi. northwest of Lockford, $115,327; five bridges over Tom Paine Slough on Tracy-Banta Rd. 3 mi. north of Tracy, Pescadero Colony Tract, $30,033.

Conn., Glenbrook (Stamford)—New York, New Haven & Hartford R. R. Co., E. E. Oviatt, ch. engr., Water St., New Haven, overpass, Glenbrook Crossing. Over $25,000.

★**Iowa and Nebraska**—Iowa State Hy. Comn., Des Moines, Ia., and State Dpt. Rd. & Irrigation, Lincoln, Neb., bridge over Missouri River at Sioux City, Ia. $1,000,000. Sverdrup & Parcel Co., Railway Exchange Bldg., St. Louis, Mo., engrs.

Ia., Mason City—Pearl Kellogg, city clk., City Hall, underpass, $175,000. M. E. Riley, city engr.

Minnesota—State Hy. Dpt., Minneapolis, making surveys bridge over Great Northern R. R. west of Melrose, $25,000 (not official).

★**N. Y., Buffalo**—City Council, J. J. Kelly, mayor, City Hall, elimination of grade, Perry St., $350,000; new steel, concrete highway bridge over Buffalo River, Ohio St., $742,000; new bridge over Ship Canal, S. Michigan Ave., $500,000.

N. Y., Eastchester—Town and Westchester Co., White Plains, Harney Rd. bridge. $60,000.

O., Akron—Bd. Comrs. Summit Co. erecting 13 bridge structures, $470,000. A. F. Ranney, Akron, co. engr.

★**O., Cleveland**—Bd. Comrs., Cuyahoga Co., miscellaneous culverts and sewers, $510,000. J. O. McWilliams, Cleveland, co. engr.

★**O., Cleveland**—Bd. Comrs. Cuyahoga Co., erecting 12 new bridges, $1,385,000; miscellaneous bridge repairs, $40,000. J. O. McWilliams, Cleveland, co. engr.

★**O., Coshocton**—Bd. Comrs. Coshocton Co., 100 rein.-con. bridges, culverts, $600,000; erecting 400 ft. span bridge over Muskingum River, $150,000; constructing twin grade crossing elimination project, $250,000. K. H. Kinkley, Coshocton, co. engr.

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POSTWAR PROJECTS (Cont'd.)

★**O., Hamilton**—City, R. P. Price, mgr., City Hall, viaduct at South Hamilton railroad crossing, $500,000. A. A. Smalley, city engr.

O., Logan—Bd. Comrs., Hocking Co., twenty-five 8 to 20 ft. span bridges, $75,000. O. Wolfe, Logan, co. engr.

O., Medina—Bd. Comrs. Medina Co., miscellaneous ditches. $30,000. C. H. Bricker, Medina, co. engr.

O., Newark—Bd. Comrs., Licking Co., 50 small bridges, $125,000. E. Watkins, Newark, co. engr.

O., Port Clinton—Bd. Comrs. Ottawa Co., jetty construction. $32,000. D. J. Nissen, Port Clinton, co. engr.

O., Sidney—Bd. Comrs. Shelby Co., erecting 20 new bridges $250,000. E. C. Wooddell, Sidney, co. engr.

O., Tiffin—Bd. Comrs. Seneca Co., 8 bridges, $46,420. W. H. Heim, Tiffin, acting co. engr.

★**O., Toledo**—Bd. Comrs., Lucas Co., 6 railroad grade elimination projects, $2,808,000. B. G. Kesting, Toledo, co. engr.

★**Pa., Pittsburgh**—City, Dpt. P. Wks., City Hall, bridge reconstruction and bridge repair shop, 5 projects. $1,657,000.

Tex., San Antonio—Missouri Pacific R. R. Co., F. E. Bates, ch. engr., Missouri Pacific Bldg., St. Louis, Mo., overpasses inside city limits.

Tex., Texarkana—S. H. Atkinson, mayor, City Hall, overhead viaduct for pedestrian and vehicles over Missouri Pacific Railroad crossing at airport, $100,000.

★**B. C., Vancouver** — Municipality, high-level bridge from foot of Granville St. to pass over raceway, link with the small island in midstream and span the north arm of the Fraser River at height to make it rarely necessary to open for navigation. Over $500,000.

B. C., Vancouver—Municipality, City Hall, reconstructing existing bridge on Sea Island, at Marpole $150,000 or constructing new bridge on same site, $350,000.

N. B., Jemseg—Province of New Brunswick, c/o Ministry P. Wks., Fredericton, bridge replacing cable ferry, Queens Co. $75,000. P. W. Minue, Hy. Dpt., Fredericton, engr.

Ont., Sudbury—Dpt. Hys., Toronto, overhead from Riverside to Van Horne Sts., $300,000; overhead from Beach to Pine Sts., $300,000; subway from Lorne to Frood Rd., $250,000; subway from Regent N. to Frood Rd., $45,000; overhead bridge from Drinkwater to Paris St., $200,000; subway at Riverside and Regent crossing.

Que., Quebec City—City, F. X. Chouinard, secy., 2 subways under Canadian National R. R. tracks. $300,000.

★**Que., Quebec City**—Municipality, F. X. Chouinard, city clk., City Hall, viaduct from foot of Palace Hill in front of Arsenal to Samson bridge, $1,000,000. Ed. Hamel, City Hall, engr.

ROADS

★**Calif., Merced**—Merced Co., Court House, hy. from Merced to Los Banos, 25 mi., $920,000; straightening, widening, imprv. Santa Fe Ave. from Merced to Stanislaus Co. Line., $106,375; new road from Loa Banos to Stevinson, 17.25 mi., $508,250; new road from Livingston to El Capitan Rd., in Delhi, 3 mi., $102,400; imprv. Snelling-LaGrange Rd. to Stanislaus Co. line, 6.5 mi., $37,500; new road from present Dos Palos Y to proposed Los Banos-Merced Rd., 7.25 mi., $189,500; imprv. road connecting Minturn, LeGrand & Yosemite Hy., 13.5 mi., $72,000.

Calif., Stockton—San Joaquin Co., Courthouse, widening East Main St. for 2½ mi. east to Diverting Canal east of Stockton, $114,439; imprv. Grant Line Rd. south to State Hy. in Tracy, following west line of City of Tracy, $28,250; replacing narrow pavement on South Hutchins and West Lodi Ave. in Lodi with 36 ft. pavement, concrete curbs, gutters, $64,852.

Ill., Collinsville—City, c/o Mayor G. W. Killinger, City Hall, paving, curbing, etc. Bond, Clay and Goethe Sts., Indiana, Juda, Jefferson and Spring Aves. $196,500.

Ind., Rockville—Bd. Trustees Indiana State Sanatorium, H. B. Pirkle, supt., Rockville, roadways, walks, drives. $40,000.

Ia., Shenandoah—City Council ordered city engineer to make survey for pavement and resurfacing needs.

★**Mass., Lynn**—City, Comn. on Ways & Drainage, City Hall, city-wide street bldg. and paving, sidewalks and curbs. Over $500,000.

★**Minn., Long Prairie**—Todd Co., grading, surfacing roads, $750,000. O. Lange, co. engr.

★**New Jersey**—State Rd. Dpt., Trenton, exten. Route 4 and constructing Route 22 from Woodbridge, Middlesex Co. to Irvington, Essex Co. $11,325,000; widening, constructing Route 25 from Port St., Newark to Skyway (Pulaski), Essex Co., $5,200,000; further imprvs. Route 25 from Port St., Newark to North Ave., Elizabeth, Union Co., $2,140,000; completing Route 1 in Bayonne, Hudson Co., $2,800,000.

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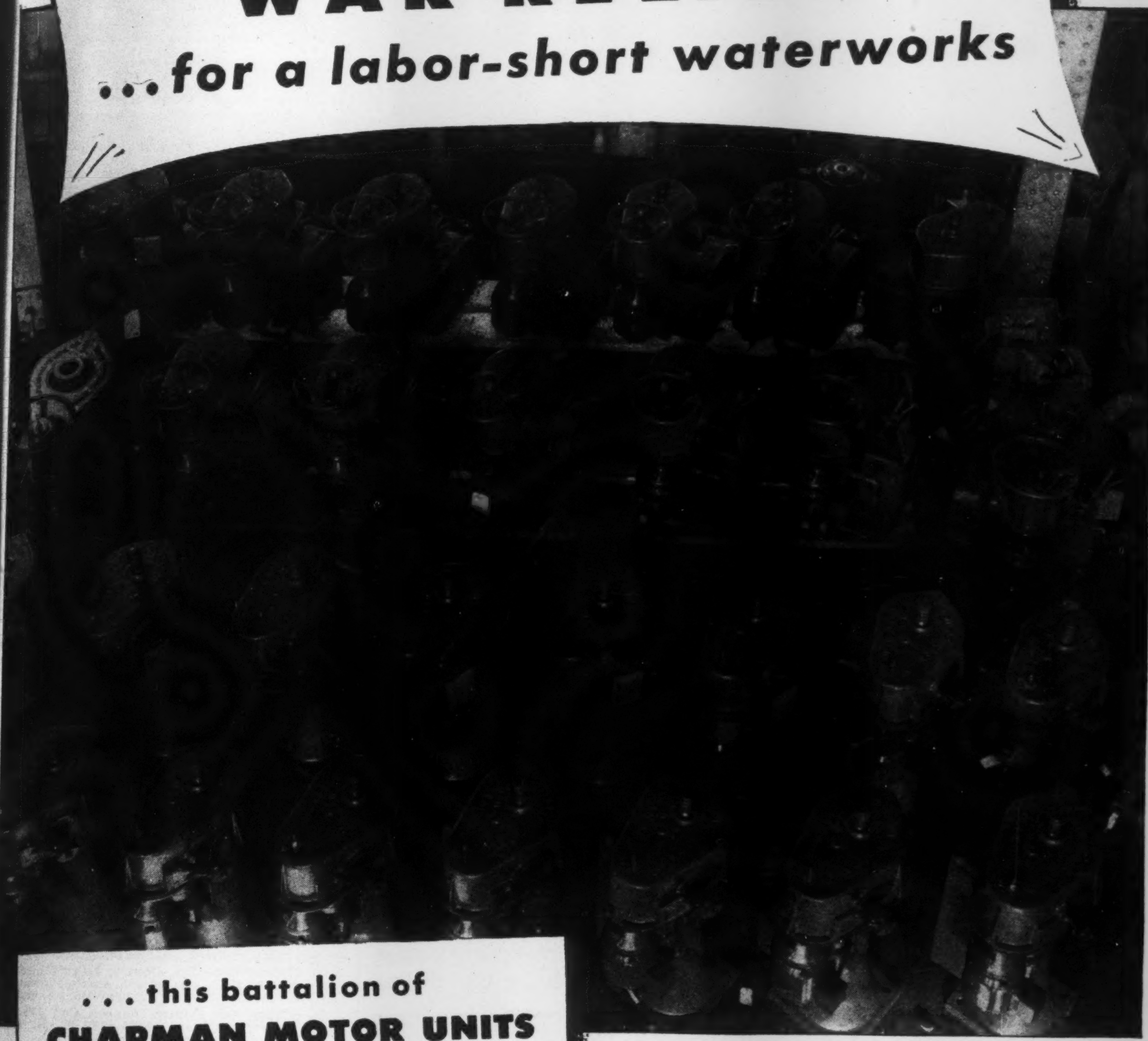

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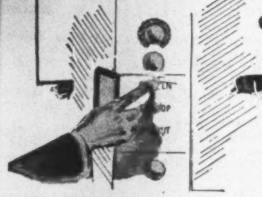

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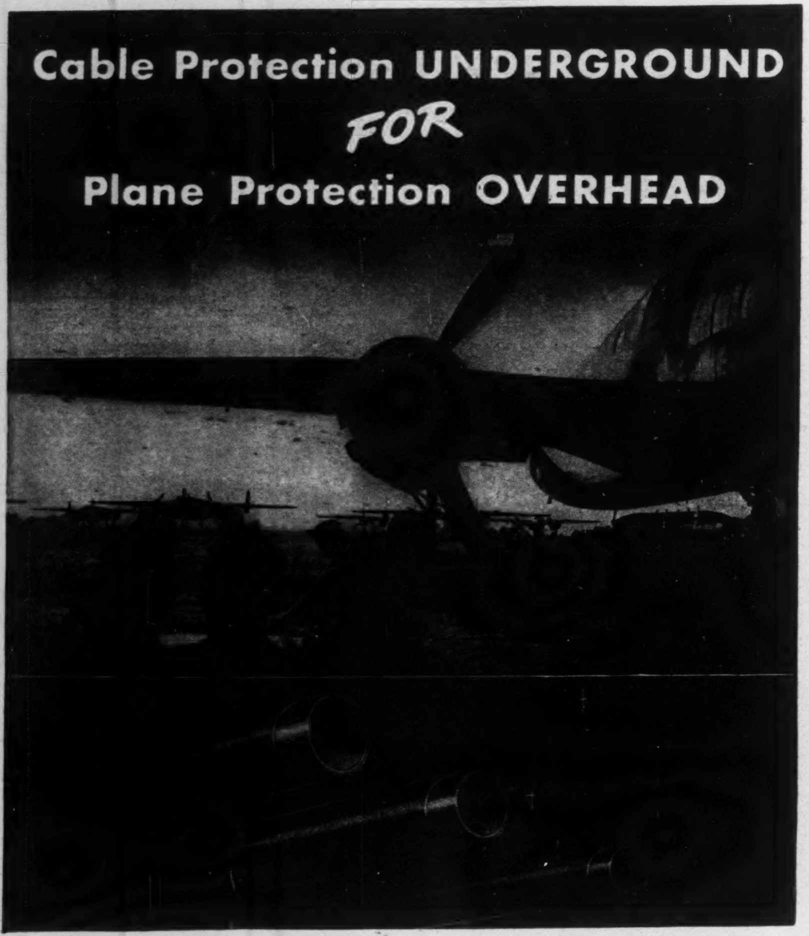

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POSTWAR PROJECTS (Cont'd.)

N. J., Bloomfield—Town, Municipal Bldg., road over abandoned Morris Canal bed from Belleville Ave. to James St. $190,000.

N. J., Bloomfield—Town, Municipal Bldg., road imprvs., surface treating, road exten., etc., various streets, $386,000.

★ **N. J., East Orange**—City, City Hall, new roads, repairing existing ones, $750,000.

★ **N. J., Irvington**—Town, Town Hall, repairing, resurfacing various streets regrading, curbing and paving Union Ave., from Mill Rd. to Hillside line and for resurfacing more than 200,000 sq. yd. street pavements, $525,000. J. Casey, Town Hall, engr.

★ **N. J., Orange**—City, City Hall, imprv. various streets, $800,000.

★ **New York and New Jersey**—Palisades Interstate Park Comn., State Office Bldg., New York, N. Y., and Govs. of New York and New Jersey, 43 mi. Palisade Interstate Parkway from George Washington Bridge exten. along top of Palisades overlooking Hudson River to New York-New Jersey state line, $18,000,000.

N. Y., Eastchester—Town and Westchester Co., White Plains, Columbus Ave. exten. to Scarsdale Ave., $75,000; hys., $150,000.

N. Y., Elmsford—Village and Westchester Co., White Plains, roads, $45,000.

★ **N. Y., Mount Pleasant**—Town and Westchester Co., White Plains, West Lake Dr., $260,000; Nannahagen Rd., $140,000; Hardscrabble Rd., $155,000.

N. Y., Pleasantville—Village and Westchester Co., White Plains, Tompkins Ave. exten. $50,000.

N. Y., White Plains—City and Westchester Co., White Plains, new walks, widen and reset curbs, $65,000; curbs, walks, pavement Ogden Ave., $77,000; sidewalks, curbs, Longview Ave., $138,400; resurfacing William St., $188,000.

★ **Ohio**—State Hy. Dpt., Columbus, 5 major hy. projects, $50,000,000.

★ **O., Akron**—Bd. Comrs. Summit Co., constructing 156 mi. hy. imprvs., $2,937,170. A. F. Ranney, Akron, co. engr.

★ **O., Cleveland**—Bd. Comrs., Cuyahoga Co., 25 road imprv. projects, $3,812,500. J. O. McWilliams, Cleveland, co. engr.

O., Coshocton—Bd. Comrs., Coshocton Co., surface treating 100 mi. roads, $120,000. K. H. Kinkley, Coshocton, co. engr.

O., Defiance—Bd. Comrs. Defiance Co., 26 mi. road construction. $156,000. J. E. Leaders, Defiance, co. engr.

★ **O., Elyria**—Bd. Comrs., Lorain Co., widening, reconstructing roads and erecting high level bridges over Black River, $2,000,000. D. E. Patterson, Elyria, co. engr.

O., Lima—Bd. Comrs., Allen Co., constructing and reconstructing 200 mi. roads; erecting 50 concrete bridges, 14 to 30 ft. spans. H. M. Mumaugh, Lima, co. engr.

★ **O., Logan**—Bd. Comrs. Hocking Co., 56 mi. co. and township road imprvs. $1,536,000. O. Wolfe, Logan, co. engr.

★ **O., Mansfield**—Bd. Comrs. Richland Co., road resurfacing, $962,000; road and bridge construction program, $3,000,000. H. Sword, Mansfield, co. engr.

O., Medina—Bd. Comrs. Medina Co., road imprvs. $100,000. C. H. Bricker, Medina, co. engr.

O., Mt. Gilead—Bd. Comrs. Morrow Co., road imprv., bridge replacement. $125,000. O. C. Richey, Mt. Gilead, co. engr.

O., Painesville—Bd. Comrs. Lake Co., 2 concrete roads, $158,000; 30 mi. surface treatment $26,000. A. B. Wilson, Painesville, co. engr.

O., Tiffin—Bd. Comrs. Seneca Co., 189.5 mi. road imprv. program, $429,067. W. H. Heim, Tiffin, acting co. engr.

★ **O., Toledo**—Bd. Comrs. Lucas Co., 60 mi. road imprvs., $2,238,000; 13 road widening projects, $1,206,000. B. G. Kesting, Toledo, co. engr.

O., Wooster—Bd. Comrs. Wayne Co., road widening, resurfacing. $166,677. W. Metzler, Wooster, co. engr.

Oregon—State Hy. Dpt., State House, Salem, constructing 4 mi. north Santiam Hy. between Gates and Niagara, Marion Co. $400,000. R. H. Baldock, State House, engr.

★ **Ore., Marshfield**—Coos Co., Court House, roads and bridges. $735,318. J. N. Gearhart, Court House, engr.

★ **Pa., Pittsburgh**—City, Dpt. P. Wks., City Hall, street repaving 94 projects, $4,153,500; street opening, widening, paving and repaving 14 projects, $297,100; 50 mi. curb replacement, $820,000.

Tex., Texarkana—S. H. Atkinson, mayor, asphalt and concrete paving streets, $250,000.

Tex., Texarkana—S. H. Atkinson, mayor, paving and closing drainage ditches throughout city, $150,000.

★ **Alta., Edmonton**—A. Russell, city clk., City Hall, street imprvs., incl. paving work, $3,800,000; sidewalks on various streets, $250,000. A. W. Haddow, c/o owner, engr.

B. C., Victoria—City, road projects, $250,000.

Ont., Fergus—Wellington Co., c/o J. F. Beattie, clk., imprv. roads, bridges, replacing bridges and addns. to Kings Hy. $1,000,000. W. H. Keith, County Bldg., Guelph, engr.

Ont., Picton—Town, F. L. Ward, clk., laying sidewalks, pavements, $300,000. G. G. Reid, 7 Edmond Ave., Toronto, engr.

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THERE was no cheering when this Electric Blasting Cap left the "assembly line." Like the millions before it . . . it embodied the latest improvements in cap design and had been manufactured to the same high standards that have made Du Pont Electric Blasting Caps preferred by users everywhere.

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Victory by our Armies means new liberty for Postwar activity. Manufacturers and municipalities then can, and will be expected to go ahead with plans of progress.

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For Postwar Water System planning, write for illustrated literature on Layne Pumps and Layne Well Water Systems. Address, Layne & Bowler, Inc. General Offices, Memphis 8, Tennessee.

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WELL WATER SYSTEMS
DEEP WELL PUMPS

Builders of Well Water Systems
for every Municipal and Industrial Need

POSTWAR PROJECTS (Cont'd.)

EARTHWORK—IRRIGATION DRAINAGE—WATERWAYS

★ **†Alabama**—U. S. Eng., Grant St. west of Westwood St., Mobile, locks and dams and other navigational facilities on Alabama and Coosa River, $60,000,000.

★ **†Alabama** and **Mississippi**—U. S. Eng., Grant St. west of Westwood St., Mobile, Ala., imprv. navigation in Warrior and Tombigbee rivers incl. new lock and dam near Demopolis, Ala. $6,750,000.

★ **†Connecticut**—U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., dredging New Haven Harbor, $2,500,000; Guilford Harbor, $25,500; Clinton Harbor, $21,900; Connecticut River, below Hartford, $72,900; Mystic River, $20,000; Greenwich Harbor, $31,000; Norwalk Harbor, $30,000; Bridgeport Harbor, $525,000.

★ **†Florida** and **Georgia**—U. S. Eng., 575 Riverside Ave., Jacksonville, 2, Fla., dredging, imprv. channel in Apalachicola, Chattahoochee and Flint river, $6,500,000.

★ **†Florida**—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, imprv. Miami Harbor, $5,781,000; channel in Miami River, $77,200; dredging, imprv. Intracoastal Waterway between Miami and Key West, $1,830,000 all foregoing Dade Co.; dredging, imprv. Intracoastal Waterway between Coloosahatchee River and Anclote River, Lee Co., $3,200,000; channel in St. Johns River between Jacksonville and Ocean, Duval Co., $725,000; channel in St. Johns River between Palatka and Lake Harney, Putnam Co., $290,000; waterway from Punta Rosa to Ft. Pierce and Stuart, Martin Co., $208,000; imprv. Little Manatel River, Sarasota Co., $77,000; Withlacoochee River Channel, Lee Co., $51,000; Alafia River Section of Tampa Harbor, Hillsborough Co., $189,000; Hillsborough River Section to Tampa Harbor, $60,000; Intracoastal Waterway from Apalachicola Bay to St. Marks River, Gulf Co., $32,500; St. Marks River channel, Wakulla Co., $71,000; harbor at Canaveral, Brevard Co., $830,500; St. Lucie Inlet at Ft. Pierce, St. Lucie Co., $46,000; channel in New River near Ft. Lauderdale, Broward Co., $60,000; enlarging sections levees in Coloosahatchee-Lake Okeechobee drainage area, Lee and Glades Counties, $3,960,000; deepening channel in Intracoastal Waterway between Jacksonville to Miami to 12 ft., Duval Co., $11,789,000; dredging channel from Intracoastal Waterway to Vero Beach, $73,000; channel from Intracoastal Waterway to Sebastian, $19,000 both Indian River Co.; in entrance and inner channel and turning basin in St. Joseph Bay, Bay Co., $225,000.

N. J., Bloomfield—Town, Municipal Bldg., paving bottom and constructing retaining walls along Toney's Brook from Glenwood Ave. to Glen Ridge line, $65,000; paving bottom of Second River from Bloomfield Ave. to Belleville Line, $250,000.

★ **N. J., East Orange**—City, City Hall, retaining walls, earth dams, etc., for flood control. $582,000.

N. J., Millburn—Town, Hown Hall, widening east branch Rahway River and building retaining walls, $80,000.

★ **†North Carolina**—U. S. Eng., First and Douglas St. N.W., Wash., D. C., Inland Waterway from Beaufort, N. C., to Norfolk, Va., $39,000; Chowan River, N. C. and Black Water River, Va., $135,000; Pembroke Creek, near Edenton, $9,500; channel from Pamlico Sound to Radanthe, $5,000; channel from Pamlico Sound to Avon, $16,500; Rollinson Channel, $27,000; Waterway connecting Swan Quarter Bay with Deep Bay, $22,500; Neuse and Trent Rivers, $11,000; channel connecting Thoroughfare Bay with Cedar Bay, $20,000; Waterway connecting Pamlico Sound with Beaufort Harbor, $42,000; channel from Back Sound to Lookout Bight, near Beaufort, $50,000; Beaufort Harbor, $54,000; Inland Waterway, Beaufort to Cape Fear River, incl. waterway to Jacksonville, $33,000; Cape Fear River at end below Wilmington, $1,465,000; Northeast Cape Fear River, $73,000; Intercoastal Waterway from Cape Fear River to Winyah Bay, S. C., $11,000.

O., Akron—Bd. Comrs. Summit Co., Cuyahoga River straightening proj. $15,000. A. F. Ranney, Akron, co. engr.

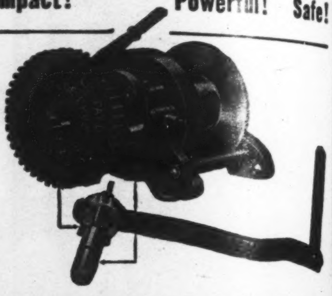
O., Circleville—Bd. Comrs. Pickaway Co., drainage and ditch constr. $80,000. H. T. McCrady, Circleville, co. engr.

O., Sidney—Bd. Comrs., Shelby Co., 100 mi. berming-ditching and road widening $200,000; 100 mi. black top road construction $200,000. E. C. Wooddell, Sidney, co. engr.

O., Van Wert—Bd. Comrs. Van Wert Co., ditch construction. $100,000. T. K. Priddy, Van Wert, co. engr.

★ **†South Carolina**—U. S. Eng., First and Douglas Sts. N.W., Wash., D. C., imprv. Winyah Bay, $1,260,000; Beresford Creek, $21,000; Charleston Harbor, $1,820,000; Abbapoola Creek, $10,000; Russell Creek, $15,500.

★ **O., Hamilton**—City, R. P. Price, mgr., City Hall, elimination of river pollution. $1,500,000. A. A. Smalley, city engr.



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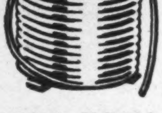

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The dependable self-caulking joint compound for jointing cast iron water mains — uniform — easy to prepare — easy to use — in service for more than 30 years.

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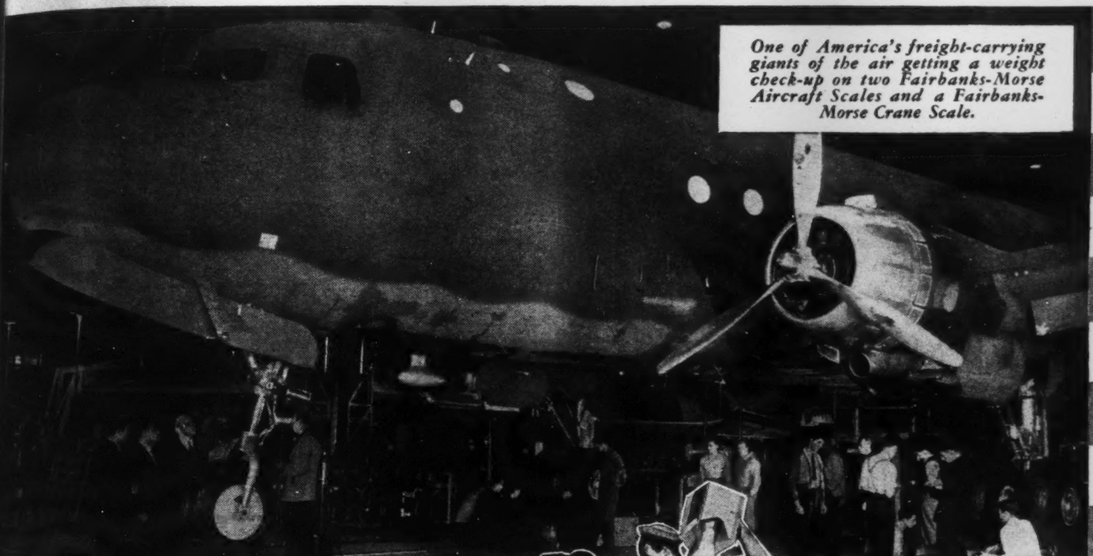
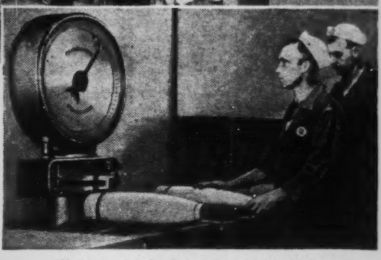
Fairbanks-Morse Scales in Warwork



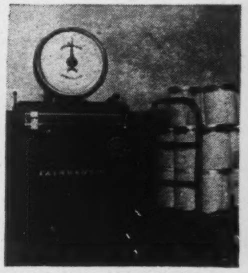
One of America's freight-carrying giants of the air getting a weight check-up on two Fairbanks-Morse Aircraft Scales and a Fairbanks-Morse Crane Scale.

• WARWORK means *weigh-work* for Fairbanks-Morse Scales. They're weighing munitions . . . food . . . chemicals . . . tanks . . . aircraft . . . shells . . . just about everything, in fact. They are weighing at speeds which human hands can't match. They're weighing with accuracy that human eyes can't equal. They're working in endless shifts that human stamina can't endure. They're helping to speed up America's war effort on the production front, for Fairbanks-Morse Scales are "at home" on the production front, in peace or in war. Fairbanks, Morse & Co., Fairbanks-Morse Building, Chicago, Illinois.

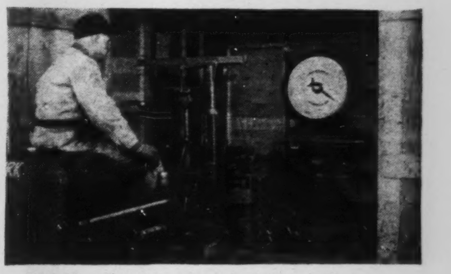
Weighing an "egg" for the Axis.



Correct weight for accurate gunnery.



Frozen eggs—NOT for the Axis!



Weighing charging materials at iron works furnace.

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UNCOVERED!

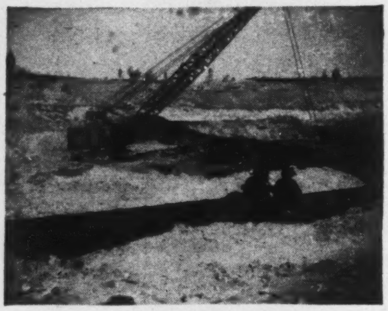
HOW NAYLOR PIPE SOLVED
THE PROBLEM WHEN A LAKE GOT IN THE WAY

The scene was a wilderness with a rich deposit of ore buried beneath a lake. Efforts to mine by shaft methods were drowned out repeatedly.

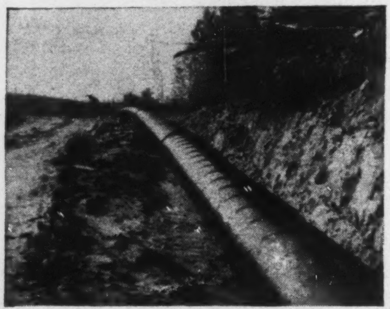
Then engineers went in with pumping equipment and Naylor Lockseam Spiralweld Pipe and literally "moved" the lake to distant natural drainage.

The tough job of eliminating water and quicksand was simplified by the structural advantages of Naylor Pipe and today a battery of power shovels dig deep to unearth the buried treasure.

The light weight, greater ease of handling and installing, quicker connections, closer conformity to the terrain, leaktightness, safety and, above all, the ability to handle pressures normally requiring heavier-wall pipe have made Naylor Pipe first choice on applications like this.



Naylor pipe from sump merges at valve station with main 20-inch line.



Naylor 20-inch pipe line is main discharge for mine water. Note conformity of pipe to terrain.

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Dredging • Hydraulic Sluicing
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Pulp Lines • Vacuum Lines and other high or low pressure lines.
Sizes from 4" to 30" in diameter.

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POSTWAR PROJECTS (Cont'd.)

O., Medina—Bd. Comrs. Medina Co., mi cellaneous ditches. $30,000. C. H. Bricke Medina, co. engr.

O., Port Clinton—Bd. Comrs. Ottawa C jetty construction. $32,000. D. J, Nisse Port Clinton, co. engr.

O., Toledo—Bd. Comrs. Lucas Co., 4.1 m ditches. $59,000. B. G. Kesting, Toledo, c engr.

★**Pa., Pittsburgh**—City, Dpt. P. Wks., Ci Hall, walls and cribs, $500,000.

★**†Texas**—Bureau of Reclamation, Interi Bldg., 19 and C Sts. N.W., Wash., D. deepening Trinity River from its mouth area of Liberty, incl. turning basin. $1,900,00

★**†Texas**—Bureau of Reclamation, Interi Bldg., 19 and C Sts. N.W., Wash., D. flood control dams, facilities, etc., on Trini River, Dallas-Liberty area. $13,000,000.

★**†Texas**—U. S. Eng., 25 St. and Avenue Galveston, widening ship channel betwe Morgans Point and Turning Basin, at Hou ton, $3,675,000; straightening, easing, sever bends in Houston Ship Channel zon $1,000,000, both Harris and Galveston countie

B. C., Victoria—City, retaining wall at Ro Bay. $25,250.

New Brunswick—Provincial Govt., Fred erickton, flood protection works in districts Maugerville and Sheffield. $100,000. Dp P. Wks., Frederickton, engrs.

UNCLASSIFIED

Calif., Santa Cruz—WHARF—City, Cit Hall, reconstructing municipal wharf. $50,00 D. McPhetres, City Hall, acting city engr.

Ind., Vernon—UTILITIES TUNNELS—B Trustees Muscatatuck State School (For Feebl Minded), M. N. O'Bannon, supt., utiliti tunnels, $235,000. Jno. M. Rotz Eng. Co 804 Merchants Bank Bldg., Indianapoli mech. engr.

Ia., Marshalltown — AIRPORT — Anne Mc Mahon, city clk., airport. Over $75,000.

★**Md., College Park**—STADIUM, etc.—Uni versity of Maryland, College Park, footba stadium seating 60,000; fieldhouse for basket ball and boxing matches, seating 12,000; in door swimming pool, girls' gymnasium addn $800,000.

Mo., Kansas City—CLUB HOUSE—Kansa City Park Bd., J. A. Moore, pres., City Hall club house, Swope Park No. 2 Golf Course E. Buehler Delk, 11 W. Concord St., archt.

★**N. J., Bloomfield**—WALLING, etc.—Town Municipal Bldg., walling, paving, con structing parkway along Third River $1,000,000.

N. J., Orange—PLAY AREA IMPROVE MENTS—City, City Hall, play area imprvs, incl. shelter house, $40,000; grandstand $35,000, both at Central Playground.

N. Y., Mount Pleasant—ATHLETIC FIEL IMPROVEMENTS—Town and Westcheste Co., White Plains, Union Free School athleti field imprvs. $100,000.

N. Y., White Plains—FIRE ALARM SYSTEM—City and Westchester Co., White Plains, installing underground fire alarm sys $200,000.

O., Coshocton—AIRPORT—City and Coshocton Co. Bd. Comrs., county-municipal airport $100,000. K. H. Kinkley, co. engr., and G. A. Stewart, city engr., both Coshocton.

★**Pa., Pittsburgh**—RECREATION FACILITIES, etc.—City, Dpt. P. Wks., City Hall, recreation facilities, 33 sites, $3,000,000; park imprvs., 21 projects, $5,600,000; concrete steps, 115 locations, $860,950.

Tex., El Paso—NATURAL GAS DISTRIBUTION SYSTEM—Southern Union Gas Co., Burt Bldg., Dallas, natural gas distr. sys., facilities, expansion, imprvs. Over $25,000.

★**Wash., Spokane**—MEMORIAL—City, City Hall, memorial for present war servicemen. $1,000,000.

Wis., Sheboygan—DOCK—Bd. P. Wks., J. Stranberg, pres., City Hall, rebuilding dock, $30,000-$50,000. A. L. Boley, city engr.

Wis., Two Rivers—PARK IMPROVEMENTS—City, A. O. Allie, clk., City Hall, Neshotah Park imprvs. $30,000.

★**Alta., Edmonton** — POWER DEVELOPMENT—Municipality, surveys hydro power development from river. $500,000.

★**Alta., Edmonton** — STREET RAILWAY CONVERSION, etc.—A Russell, city clk., City Hall., street railway conversion, $860,000; light and power distr. sys., $1,305,000. A. W. Haddow, c/o owner, engr.

★**B. C., Vancouver**—AIRPORT BUILDING—Municipality, c/o Airport Mgr. W. Templeton, administration bldg. $500,000.

★**B. C., Victoria**—TELEPHONE and ELECTRIC LIGHT WIRING, etc.—City, placing telephone and electric wires underground; imprv. Portage Inlet, Victoria Arm and Selkirk Water; illumination of 5 mi. Marine Dr. and replacement cluster lights with single units, $199,100; roads, paths, walks, band shell, bowling green, memorial rose garden, tennis courts and fountains at Beacon Hill Park, $342,500.

For All Types of Wiring

FLAMENOL*

Small Diameter

BUILDING WIRE

FLAMENOL BUILDING WIRE, TYPE SN

Flamenol thermo-plastic insulated small-diameter wire, Type SN, is available in sizes 14 to 1,000,000 CM. (Resins are now permitted for electrical conductor insulation wherever copper is allocated.) Its small diameter, comparatively light weight and smooth finish make it easy to handle. It will give long dependable service.

Flamenol Building Wire was developed before the war. It has been used for a number of years in all sorts of buildings. *It is ideal for maintenance work, for rewiring or for new wiring.* It is approved by the Underwriters'. Its insulation is superaging, high in dielectric and mechanical strength, flame retarding and resistant to oils, moisture, acids, etc.

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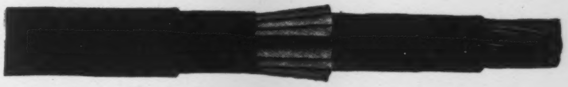
LEADED CABLE - TYPE RL



G-E single- and multi-conductor lead sheathed cables are available in sizes 14 to 2,000,000 CM. These sturdy cables are insulated in accordance with WPB limitations and are sheathed with commercially pure lead formed tightly around the core. Special precautions are taken to control the thickness of the lead and to center the cable in the sheath.

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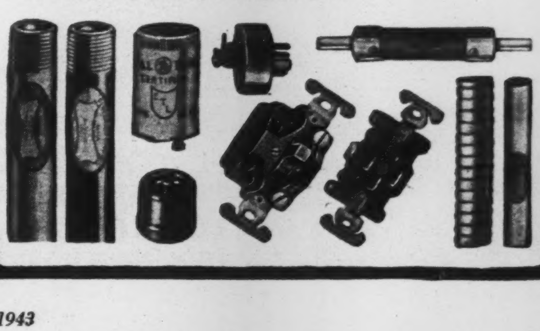
General Electric also offers for war wiring needs: G-E White hot-dipped galvanized conduit and G-E Black enamelled conduit, EMT, flexible metal conduit and hundreds of switches, lampholders, outlets, fuses, etc.



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Round and Round
It Goes
IT'S GOOD
Everybody Knows
"FLEX-PLANE"
FLEXIBLE ROAD JOINT MACHINE CO.
WARREN OHIO, U.S.A.

On The Inter-American Highway

A large fleet of LINN HAFTRAKS solves
the problem of removing rock and rubble.
THE LINN MANUFACTURING CORPORATION
MORRIS, NEW YORK

POSTWAR PROJECTS (Cont'd.)

B. C., Victoria—WHARF, etc.—City, whar and bldgs., $60,000.

New Brunswick—CRANBERRY BOGS, etc —Province of New Brunswick, Fredericton, development of Cranberry bogs and constructing forest roads in province, $150,000. G. L. Miller, Frederickton, ch. forester.

N. B., Gagetown—PARK DEVELOPMENT—Province of New Brunswick, Fredericton, developing Mount Champlain National Park site, $150,000. G. R. Miller, Fredericton, ch forester.

N. B., Harvey—DAM—Provincial Govt., Fredericton, dam across Shepody Bay reclaiming 5,000 acres land and necessary dyking. N. B. Power Com., Saint John, engr.

N. B., Hopewell Cape—PARK—Albert Co., c/o Geo. C. Blight, Hopewell Cape, nationa park construction. $200,000.

N. B., Hopewell Cape—POWER DEVELOPMENT—Provincial Govt., Fredericton, hydr power development at Petitcodiac Dam and in crooked creek area. $300,000. N. B Power Com., Saint John, engr.

N. B., Sussex—AIRPORT—Municipality, H E. D. Golding, mayor, municipal airport, $150,000.

N. S., Amharst—WHARFS—Dominion Govt., Ottawa, Ont., addnl. wharfs on Northumberland Strait, $100,000. Dpt. P. Wks., Ottawa, Ont., engr.

★**N. S., Copper Lake**—AIRPORT—Dominio Govt., Ottawa, Ont., civil airport, $6,000,000. Dpt. Transport, Ottawa, Ont., engrs.

N. S., Halifax—RECREATION SPACES—Municipality, recreation spaces around city schools. $50,000. Bd. School Comrs., City Hall, engr.

★**N. S., Lyon's Brook**—AIRPORT—Dominion Govt., Ottawa, Ont., civil airport with seaplane base facilities. $1,500,000. Dpt. Transport, Ottawa, Ont., engrs.

Ont., Oakville — AIRPORT — Municipality, F. M. Deans, mayor, City Hall, airport serving Toronto-Hamilton area. $150,000.

Ont., Port Colborne—PARKS, etc.—Municipality, parks, playgrounds and fire hall. $115,000. C. E. Grassie, Town Hall, engr.

Que., St. Lambert—ARENA, etc.—Memorial Hall Com., City Hall, arena and memorial hall. $100,000.

Sask., Moose Jaw—AIRPORT—Municipality, airport 4 mi. south of here.

LATIN AMERICA

Venezuela, Caracas—Standard Oil Co. of New Jersey, Caracas, plans large refinery plant and facilities for expanded production of motor fuels, near here.

PUBLIC BUILDINGS

★**†District of Columbia**—Pub. Bldgs., Admin., 18 and F Sts. N.W., Wash., D. C., general accounting office bldg., 4 and 5 Sts. between G and H Sts. N.W., $4,245,000; and central heating plant, 12 St. between C and D Sts. N.W., $1,250,000-$2,000,000. CD 5/25—ENR 5/27.

★**Ill., Belleville**—Bd. Supevrs. St. Clair Co., Courthouse, public housing under St. Clair Co. Housing Auth., converting present county facilities into county home, construction general receiving hospital and jail, street and sewer imprvs. by municipalities in County. Over $2,000,000.

★**Ill., Springfield**—City, plans by H. A. Hammond, c/o Burnham & Hammond, Inc., 160 N. La Salle St., Chicago, and M. S. Hanes, assoc. archt., 205½ S. 6 St., 4 story, 96x173 ft., city hall, Monroe and 7 Sts. $625,000.

★**Ind., Bloomington**—Bd. Trustees Indiana University, W. G. Biddle, comptroller, bldgs. $1,590,000.

Ind., Clermont—Bd. Trustees Indiana Girls' School (Correctional), R. Arbogast, supt., school, $200,000; power house, equip., $225,000. John M. Rotz Eng. Co., 804 Merchants Bank Bldg., Indianapolis, eng.

★**Ind., Fort Wayne**—Bd. Trustees Fort Wayne State Hospital, W. F. Dunham, supt., 801 E. State St., school $350,000; nursery $150,000; employees' dormitory $200,000; infirmary bldg. $150,000; power house addn., imprvs. $50,000; rehabilitation plumbing and heating sys., exten. laundry facilities. $172,500.

Ind., Fort Wayne—Bd. P. Wks., R. G. Beams, chn., City Hall, office bldg., warehouse and garage for city utilities, Lafayette St., south of Wabash Ry. $200,000. Eng. Dpt., City Utilities Dpt., City Hall, engr.

Ind., Garrett—City Council, F. L. Feick, mayor, City Hall, municipal power plant imprvs.

★**Ind., Indianapolis**—Bd. Trustees Central State Hospital, M. Bahr, supt., W. Washington St., Mt. Jackson, Indianapolis, plans by McGuire & Shook, 1400-01 Fletcher Trust Bldg., Zone 4, 2 cottage dormitories $550,000. Jno. M. Rotz Eng. Co., 804 Merchants Bank Bldg., engrs.; plans by O. A. Tislow, 518

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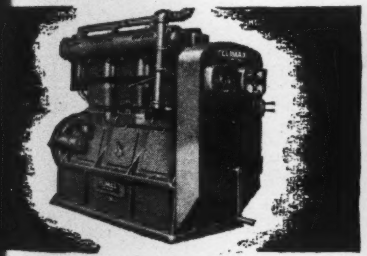
ENGINE SIZE RANGE

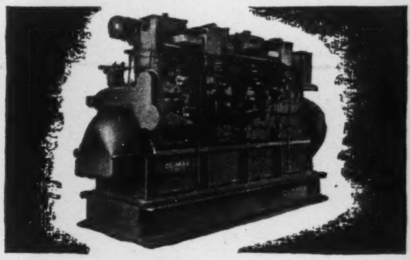
. . . for various types of construction equipment, according to a recent nationwide survey of equipment users.

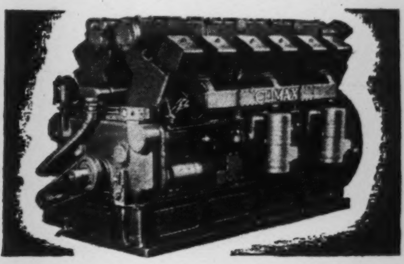
EQUIPMENT	HORSEPOWERS USED
Locomotives Get Climax Models D148, D297, N4B, R4I, R6I, R8I, V12	22 to 495
Hoists Get Climax Models D148, D297, N4B, R4I, R8I, V12	22 to 495
Power Shovels Get Climax Models N4B, R4I, R6I, R8I	75 to 220
Rock Crushers Get Climax Models D148, D297, N4B, R4I, R6I, R8I, V12	22 to 495
Pumps Get Climax Models N4B, R4I, R6I, R8I, V12	75 to 495
Air Compressors Get Climax Models N4B, R4I, R6I, R8I, V12	75 to 495
Excavators, Backfillers Get Climax Models N4B, R4I, R6I	75 to 160

to below shows a Climax Model R6I which elops 180 hp. at 1200 r.p.m.



The Climax Model R8I and generator below furnishes power and light for large municipality.





Above shows the Climax V12 Engine, 6½" bore; 425 hp., and 7" bore, 495 hp.

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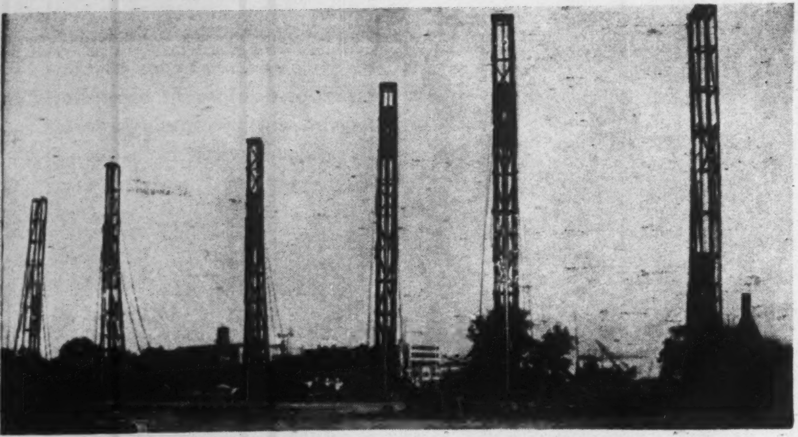

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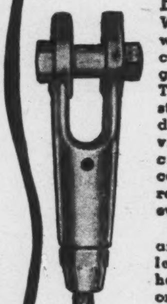

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POSTWAR PROJECTS (Cont'd.)

Architects & Builders Bldg., employes' din- ing room and kitchen, $150,000. CD 7/15— ENR 7/22.

Ind., Indianapolis — Bd. Trustees Stat School for Deaf, J. A. Raney, supt., 1200 E 42 St., Zone 5, primary cottage, $200,000.

★**Ind., Indianapolis**—Bd. Comrs. Marion Co. R. F. Moore, aud., Court House, count court house. $2,000,000.

Ind., Knightstown—Bd. Trustees Indian Soldiers' and Sailors' Children's Home, L. A Cortner, supt., infirmary, $180,000; powe house imprvs., $40,000.

Ind., Lafayette—Bd. Trustees Indiana Stat Soldiers' Home, I. C. Bauman, commandant Lafayette, dormitory, $150,000.

Ind., Madison—Bd. Trustees Madison Stat Hospital, J. W. Milligan, supt., cottage dormitory, •150,000; men's receiving ward, $150,000

★**Ind., Muncie**—Bd. Trustees Ball Stat Teachers' College, W. E. Wagoner, acting pres., college expansion, new bldgs $750,000.

Ind., New Albany—Bd. Trustees Southern Indiana Tuberculosis Hospital, J. V. Pace supt., power house addn., equip. $40,000.

Ind., New Castle—Bd. Trustees Indiana Village for Epileptics, W. C. Van Nuys, supt. New Castle, hospital $300,000; employees dormitory $185,000.

★**Ind., Plainfield**—Bd. Trustees Indian Boys' School (Correctional), E. Millard Dill, supt., dormitories, $500,000.

Ind., Richmond—Bd. Trustees Richmond State Hospital, P. D. Williams, supt., Richmond, employees' bldg., $200,000; tuberculosi ward, $150,000; power house addns., imprvs., $75,000.

★**Ind., Rockville**—Bd. Trustees Indiana Stat Sanitorium, H. B. Pirkle, supt., Rockville, new treatment and dormitory unit, $325,000; power house addn., equip., $75,000; administration and clinical bldg., $350,000.

★**Ind., Vernon**—Bd. Trustees Muscatatuck State School (for Feeble Minded), M. N. O'Bannon, supt., plans by McGuire & Shook, 1400-01 Fletcher Trust Bldg., Indianapolis, boys' dormitories, $250,000; 2 girls' dormitories, $250,000; nursery, $175,000; power house addn., equip., $75,000. Jno. M. Rotz Eng. Co., 804 Merchants Bank Bldg., Indianapolis, engr.

★**Ind., West Lafayette**—Bd. Trustees Purdu University, E. C. Ellis, pres., R. B. Stewart, controller, plans by W. Scholer, 111 State St., Lafayette, university expansion, new dormitories, education bldg., power plant imprvs. $5,000,000.

Kan., Shawnee—Bd. Educ., c/o A. L. Cross, supt., 5800 West 59 St., plans by Hardy & Schumacker, Scarritt Bldg., Kansas City, Mo., Shawnee Mission Rural High School addn., $250,000.

Minn., Anoka—Bd. Educ., Mrs. Gertrude Thomas, clk., City Hall, plans by Toltz, King and Day, 1509 Pioneer Bldg., St. Paul, 2 story, rein.-con. brick school bldg., and existing school addn. $150,000 (not official).

★**Minn., Minneapolis**—City Bd. Pub. Welfare, City Hall, public-health bldg., housing all health-dpt. units; hospital for heart cases; women's detention and convalescent hospital replacing Parkview hospital, $4,000,000.

Minn., Minneapolis—City, Bd. Pub. Welfare, City Hall, 4 story, bsmnt., 2 sub-bsmnts., rein.-con. masonry service bldg., at General Hospital housing out-patient dept. Over $150,000 (not official).

N. J., Bloomfield—Town, Municipal Bldg., imprvs. in municipal bldg., and plaza, constructing new fire station, $200,000.

N. J., East Orange—City, City Hall, main library bldg. addn., Main St. and Munn Ave. $150,000.

N. J., East Orange—City, addns. and general repairs to fire house, $150,000.

N. J., Orange—City, City Hall, combination gymnasium and assembly bldg. addns., to Cleveland St., Park Ave. and Oakwood Schools. $300,000.

★**N. J., Orange**—City, City Hall, rehabilitating slum area, housing, etc., from the Lackawanna R. R. to Central Ave. between Hickory and Oakwood Aves. $3,000,000, and city hall bldg., $500,000, city garage $60,000.

★**N. Y., Buffalo**—City Council, J. J. Kelly, mayor, City Hall, vocational high school bldg., South Buffalo, $1,750,000; 2 school addns., $935,000; public library, $3,000,000; Albright Art Gallery addn., $685,000; Meyer Memorial Hospital addn., $532,620; Museum of Science addn., $1,871,500; open air theater, Delaware Park, $179,000.

★**N. Y., New York**—Bd. Educ., 110 Livingston St., Brooklyn, Metropolitan Maritime High School, 3 story, South St. between Whitehall and Broad Sts. $3,176,650.

N. Y., Scarsdale—Village and Westchester Co., White Plains, village hall, $200,000.

N. Y., White Plains—City and Westchester Co., White Plains, city hall addn., $180,000; North St. normal school site, $50,000.

★**O., Akron**—Bd. Comrs. Summit Co., 6 township school bldgs. $1,055,000. A. F. Ranney, Akron, co. engr.

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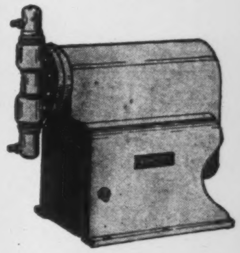

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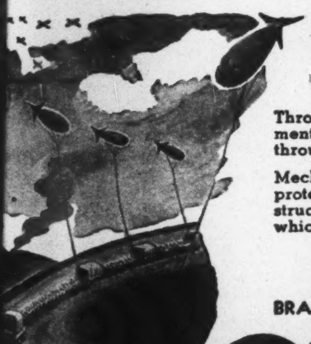

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POSTWAR PROJECTS (Cont'd.)

★**O., Coshocton**—Bd. Comrs. Coshocton Co. county office bldg. $500,000. K. H. Kinkley, Coshocton co. engr.

Ore., Marshfield—Coos Co., Court House new bldgs. $211,012. J. N. Gearhart, Cour House, engr.

★**Pa., Pittsburgh**—City Dpt. P. Wks., Cit Hall, district headquarters, hys. an sewers, 6 bldgs. $600,000; testing laborator addn., $83,000; Leech Farm Sanatorium, access road, laundry and addnl. watermain fo fire protection, $480,000; fire enginehouses police stations, warehouses and rehabilitation existing city structures, 29 project $1,786,000.

R. I., Lafayette—State, Dpt. Social Welfare, 40 Fountain St., Providence, 4 patient dormitories, Exeter School, $325,000.

R. I., Lafayette—State, Dpt. Social Welfare, 40 Fountain St., Providence, employe's dormitory, brick, concrete, Exeter School $250,000.

R. I., Lafayette—State, Dpt. Social Welfare, 40 Fountain St., Providence, servic bldg. alterations and assorted equip. $60,000

R. I., Wallum Lake—State, Dpt. Health Div. State Sanatoria, Wallum Lake, fire station and power plant imprvs., $55,000; brick storage-service bldg., $100,000, at Wallum Lake State Sanatorium.

R. I., Wallum Lake—Div. State Sanatoria, Wallum Lake, brick, steel vocational bldg., incl. classrooms, domestic science facilities, occupational therapy, $200,000; laundry and boiler house extens., addns., $45,000; altering bldgs., $220,000.

Tex., College Station—A. & M. College of Texas, hotel or similar project for housing students, over $150,000; library, over $150,000.

★**Tex., College Station**—A. & M. College of Texas, College Station, making plans auditorium, 10,000 seating capacity, $1,000,000; plans research bldgs., facilities, over $150,000.

Tex., Texarkana—S. H. Atkinson, mayor, City Hall, municipal abattoir, $40,000.

Tex., Texarkana—S. H. Atkinson, mayor, City Hall, fire station, $150,000.

★**Wash., Spokane**—School Bd., John Rogers Jr. High School bldg., $450,000; replacing Bancroft, Bryant, Edison and Irving schools, $415,000; auditorium addns. to 14 schools, $405,000; heating plant replacements, $183,000.

Wis., LaCrosse—State, plans by R. C. Kirchhoff, state archt., Madison, library $150,000, and dormitory $200,000, at State Teachers College.

★**Wis., Madison**—State, plans by R. C. Kirchhoff, state archt., wing to present home economics bldg. $200,000, new engineering bldg. $1,415,000, library $1,618,000, replacing central section chemistry bldg. $1,696,000, all at University of Wisconsin.

Wis., Platteville—State, Madison, plans by R. C. Kirchhoff, state archt., Madison, library and training school bldg., State Teachers College, $250,000.

Wis., River Falls—State, Madison, plans by R. C. Kirchhoff, state archt., Madison, agriculture and science bldg., $250,000 and men's gymnasium $150,000, at State Teachers College.

Wis., Stevens Point—State, Madison, plans by R. C. Kirchhoff, state archt., Madison, gymnasium and union bldg., State Teachers College, $300,000.

Wis., Superior—State, Madison, plans by R. C. Kirchhoff, state archt., Madison, bldg. imprvs., on campus, State Teachers College, $325,000.

Wis., Two Rivers—City, A. O. Allie, clk., City Hall, new city hall, $205,000.

★**Alta., Edmonton**—Municipality, low-priced housing scheme. $1,000,000.

★**Alta., Edmonton**—A. Russell, city clk., City Hall, telephone exchange bldg. $527,000. A. W. Haddow, c/o owner, engr.

★**B. C., Victoria**—City, modernization city schools and erection new technical shops, $1,250,000; homes for aged men, women and orphans, $750,000.

N. B., Fredericton—Provincial Govt., Fredericton, cold storage plant. $75,000. Dpt. P. Wks., Frederickton, engr.

N. B., Jemseg—Municipality, canning factory, $40,000.

N. B., Shediac—Dominion Govt., Ottawa, Ont., plans by Dpt. P. Wks., post office bldg., having provision for offices of Federal Dpts.

N. B., Shediac—Municipality in association with Provincial Govt., Fredericton, cold storage plant and barrel and shook factory, $90,000.

N. B., Shediac—Municipality, modern high school. $150,000.

N. B., Sussex—Municipality, H. Jonah, clk., rehabilitation old Agricultural School, constructing small hospital and cold storage plant. $150,000.

N. B., Sussex—N. B. Com. on Post War Reconstruction, Fredericton, establishing cement plant, Havelock area, $100,000.

N. B., Sussex—Municipality, H. Jonah, clk., packing plant, taking care of surplus stock production. $50,000.

N. B., Sussex—Province of New Brunswick Fredericton, canning plant for fruit and vegetable production. Dpt. Agriculture Fredericton, archt.

POSTWAR PROJECTS (Cont'd.)

Ont., Cornwall — Municipality, housing. $150,000. N. D. Wilson, 128 Glen Rd., Toronto, engr.

Ont., London—University of Western Ontario, Bd. Governers, plans by O. R. Moore & Co., 260 Dundas St., 1 story, 130x270 ft. field house, incl. swimming hall, gymnasium, drill hall and cafeteria. Over $150,000.

Ont., Sarnia—Dominion Govt., c/o Housing Admin., Dpt. Finance, Ottawa, 100 addnl. houses.

★ **Ont., Toronto**—F. J. Conboy, mayor, City Hall, wholesale market bldg., $500,000. W. Somers, city clk.

COMMERCIAL BUILDINGS

Ark., Conway—Hendrix College, c/o Bishop Chas. C. Selecman, Conway, new chapel, $200,000.

Conn., New Canaan—E. M. Smith, et al, c/o New Canaan Fuel & Lumber Co., New Canaan, 30 frame houses, incl. road constr., South Ave.

Conn., New Milford—New Milford Hospital, Inc., 21 Elm St., plans by F. C. Anderson, 177 State St., Bridgeport, brick, steel hospital bldg. $350,000.

Conn., Wallingford—Y. M. C. A., W. H. Denison, state dir., brick, stone bldg. $150,000. Site not selected.

★ **Ill., Decatur**—Young Men's Christian Assn., F. G. Wikoff, pres., new bldg., incl. 80 dormitory rooms, swimming pool, 2 gymnasiums, $515,000.

Kan., Kansas City—Queen of the Holy Rosary Church, c/o Bishop Paul C. Schulte, 1228 Sandusky St., church bldg., Carroll & Dean, 1220 R. A. Long Bldg., Kansas City, Mo., archts.

Mass., Norwood—Dr. F. A. Cleveland, 153 Nahatan St., plans by H. J. Korslund, 153 Nahatan St., frame residential development, Cleveland Park. Over $150,000.

★ **Mo., St. Louis**—St. Louis Archdiocese of the Catholic Church, c/o Archbishop J. J. Glennon, 4901 Lindell Blvd., Zone 8, various churches, schools and high schools. Over $2,000,000.

N. J., Madison—Madison Methodist Church, 2 Madison Ave., 1 story, bsmnt., brick church bldg. $150,000.

North Carolina—Lenoir-Rhyne College, P. E. Monroe, pres., bldgs. To exceed $150,000.

★ **N. C., Charlotte**—Queen College, 1900 Selwyn Ave., Dr. Hunter Blakely, pres., bldgs., incl. auditorium and music hall, library, health Center, chapel, dormitory and heating plant, Selwyn and Wellesly Aves. $500.000-$600.000.

Tenn., Knoxville—Knoxville Co. Baptist Assoc., c/o T. C. Wyatt, McCalla Ave., Baptist Hospital, $200,000.

Tex., Houston—Texas Mortgage Co., First National Bank Bldg., large number dwellings, facilities, utilities, etc. $375,000 or more.

Wis., Portage—St. Savior's Hospital, Portage, plans by Brielmaier & Sons Co., 735 N. Water St., Milwaukee, 4 story hospital addn. $250,000.

INDUSTRIAL BUILDINGS

Mass., Brighton—PLANT—Butchers Slaughtering & Melting Assn., brick, steel plant. Over $40,000.

O., Cincinnati—FILM EXCHANGE—Paramount Pictures, Inc., Paramount Bldg., New York, N. Y., film exchange, on 30x50x100 ft. site, Central Parkway and Findlay St.

Tex., Eagle Pass—ELECTRIC PLANTS etc.—Central Power & Light Co., Corpus Christi, imprv. to existing electric, water and ice plants and sys. $100,000 or more.

Tex., Temple—PLANT—Central Texas Compress Co., reconstructing cotton compress plant. Over $40,000.

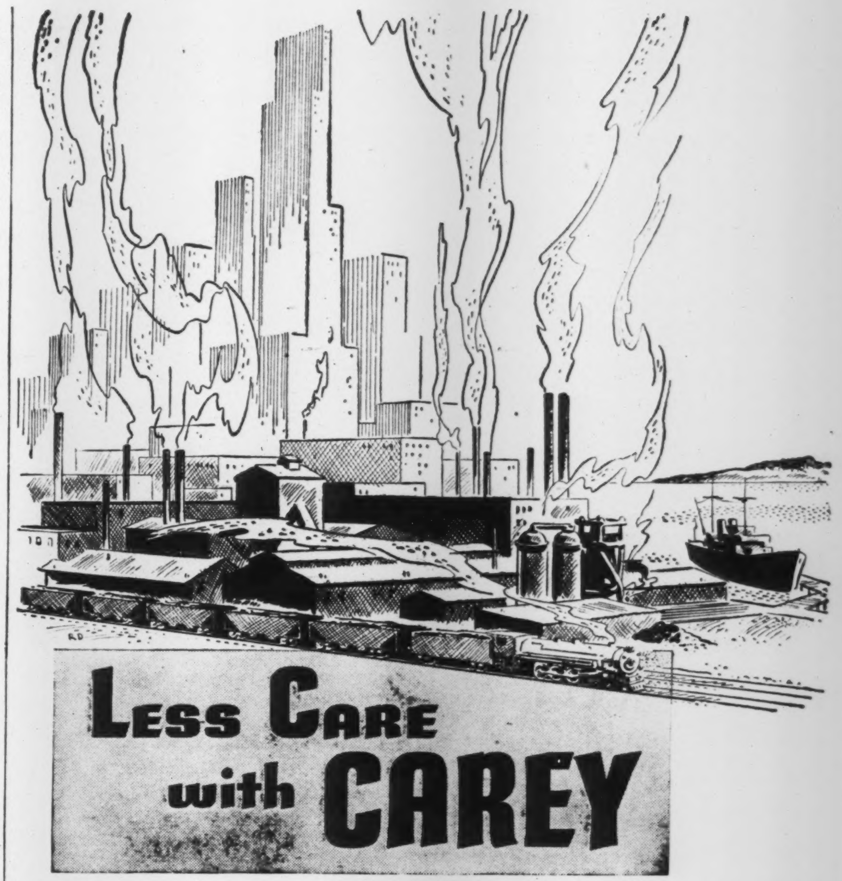
Wis., Menasha — PLANT — George Banta Publishing Co., Menasha, publishing plant bldgs. Over $40,000.

Ont., Fort William—MARINE TERMINAL, etc.—Canadian Oil Companies, Ltd., Terminal Warehouse Bldg., Toronto, marine terminal and bulk oil storage bldg. $50,000. W. C. Comop, c/o owner, Elmwood St., Winnipeg, Man., engr.

Ont., North Bay—PLANT—The Canadian Longyear, Ltd., 8 Regina St., J. G. A. Stevenson, mgr., plant. About $100,000.

Ont., Toronto—PLANT—The Glidden Co., Ltd., 372 Wallace Ave., plans by Mathers & Haldenby, 96 Bloor St. W., new plant. Est. about $100,000.

Que., Mount Royal (Montreal)—PLANT, Etc.—Seven-up, Montreal, Ltd., plans by Lake & Little, 1502 St. Catherine St. W., Montreal, addnl. story over existing 70x110 ft. plant, constructing 1 story, 45x120 ft., exten. four office, garage, syrup-mixing rooms and sugar storage, etc., and 90x165 ft., 50 truck garage, all rein.-con., brick. About $250,000.



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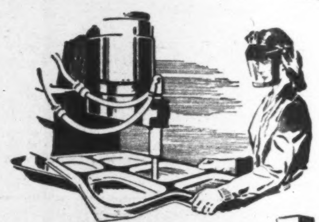

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Air Conditioner

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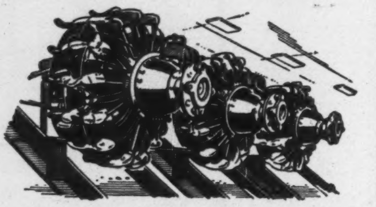
Portable Panel
Refrigeration Unit



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14 Cylinder
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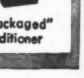

5 h.p. "Packaged"
Air Conditioner

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CONSTRUCTION REPORTS

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ELSIE EAVES, Manager *SCOTT McLEOD, Statistician*
(Daily service also available—Write for details)

WATER SUPPLY

PROPOSED WORK

Ill., Silvis—Well. $25,000.

Pa., Austin—Village Bd., S. Costa, in charge, rebuilding water pump. station, $30,000.

Pa., Midland—Midland Water Co., 2 m.g. daily capacity filtration and pump. plant, $50,000 or more. CD 8/19—ENR 8/26.

Texas—East Texas Salt Water Disposal Corp., Tyler, 2 or more salt water disposal injection wells, Gregg and Smith Counties. $150,000.

Tex., New Boston—J. R. McGee, mayor, City Hall, water and sewer imprvs., $145,362. Applied for FWA funds. F. W. Chapell, Texas Bank Bldg., Dallas, engr.

†Utah, Wattis—Lion Coal Co., Wattis, water sys., addns., enlargements, $36,000, constructing sanitary sewerage sys., $32,000 both at coal camp. **FWA.** A Foulger, genl. mgr., c/o Owner, Ogden.

Wash., Black Diamond—Water Dist. 66, to vote on plan Dec. 14, reconstructing sys. now privately owned. $75,000. Parker & Hill, Smith Tower, Seattle, Zone 4, engrs.

Wash., Longview—C. C. Tibbetts, mayor, City Hall, water filter plant, $175,000.

Wis., Marshfield—City, E. F. Kipp, supt. Utilities, City Hall, new well, pump house, pumps, etc. Over $15,000.

BIDS ASKED

†Massachusetts—U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., (selected list bidders), watermain, No. 44/66, Dukes Co.

LOW BIDDERS

Ill., Chicago—Dpt. P. Wks., City Hall, Nov. 8, electrical work for South District filtration plant, from Harmon Electric Co., 724 S. Cicero St., **$249,900.** CD 10/19—ENR 10/21.

Md., Baltimore—City Bd. Awards, City Hall, Nov. 12, core boring for Patapsco Montebello Tunnels from Reilly Eng. & Drilling Co., 1733 E. 31 St., Brooklyn, N. Y., **$38,552.** CD 6/21—ENR 5/27.

Mich., Adrian—City, piling fdn. for water filtration plant, from A. Bentley & Sons Constr. Co., 201 Belmont St., Toledo, O., **$38,600.** Pinkbeiner, Pettis & Strout, 725 Nicholas Bldg., Toledo, O., engrs.

R. I., North Kingston—Town, Water Works Comn., R. W. Rodman, Town Hall, Nov. 18, water sys., Belleville Sect., from A. E. Bragger Constr. Co., 333 Potter Ave., Warwick, **$33,439.** CD 11/9—ENR 11/11.

CONTRACTS AWARDED

†Alabama—U. S. Eng., Grant St. west of Westwood St., Mobile, addnl. water storage facilities, Inv. 569-44-165, Etowah Co., to C. F. Hooks & J. E. Woolley, 304 Ridge Rd., Birmingham, **$35,000.** Bids 11/16. CD 11/4.

†California—U. S. Eng., 74 New Montgomery St., San Francisco, water pipeline in Northern California, Spec. 1261-1, to Conner & Brant, 1222 Whipple Ave., Redwood City. Est. over **$25,000.** Awarded 11/22.

Conn., Bridgeport—Dpt. P. Wks., City Hall, c.i. watermain under water between Bridgeport and Pleasure Beach, to Merritt, Chapman & Scott Corp., 292 Pequot Ave., New London. Est. **$16,000.** CD 10/4—ENR 10/7.

†Florida—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, water supply sys. addns., Neg-Jax-44-326, Orange Co., to Langston Constr. Co., 115 W. Grant Ave., Orlando, **$25,528.** Awarded 11/26.

†Kan., Wichita—City, 400,000 gal. reservoir, Kan. 14-116, to Martin K. Eby Co., Wichita. **$19,478. FWA.** CD 11/23.

†Massachusetts—U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., water tower tank and reinforcing tank, No. 44/64, Duke Co., to Frankini Constr. Co., 30 Mystic Ave., Medford. Est. **$15,000.** Bids 11/26. CD 11/23.

Mass., Uxbridge—Town, Water Dpt., Wheelockville, water sys., well, to R. E. Chapman, High St., Oakville. Est. **$15,000.** Bids 11/23. F. A. Barbour, 1119 Tremont Bldg., Boston, engr.

†Texas—U. S. Eng., 416 Wright Bldg., Tulsa, 2, Okla., brick, rein.-con. pump house, Gray Co., to Sherman Machine & Iron Works, 26 E. Main St., Oklahoma City, Okla., approx. **$16,200.**

Alta., Edmonton—Dominion Govt., Ottawa, Ont., water and sewerage sys. at N. W. Staging Route, to Hulbert & Wilson, Edmonton, **$40,000.**

B. C., Dawson Creek—Dpt. Transport, Ottawa, Ont., water supply and distr. sys., to Gordon & Belyea, Ltd., 101 Powell St., Vancouver, about **$29,000.**

Location of ENR Correspondents

Symbols and Abbreviations Include:

†	Federal Government
★	Project of $500,000 or over
ENR	Engineering News-Record
CD	Engineering News-Record Construction Daily
A-E-M	Architect-Engineer-Management type of contract

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterworks, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

Classes of Construction

(Named in order of Listing)

Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Unclassified
Latin America
Public Buildings
Commercial Buildings
Industrial Buildings

Stages Reported

PROPOSED: (except Streets & Roads):

BIDS ASKED (new announcements only. For full calendar, see also preceding issues of ENR);

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

Note: To comply with censorship requirements, addresses on some reports are being generalized. Data which would reveal the purpose of the improvements and the size are withheld. The name of contractor and general area are reported.

B. C., Vancouver—Dpt. P. Wks., Ottawa, Ont., pump house, inflammable stores bldg., water storage tank, installing fire and steam lines, fire escapes, fire alarm sys., etc. at Shaughnessy Hospital, to Allan & Viner Constr. Co. Ltd., 602 W. Hastings St., **$53,872.**

SEWERS, WASTE DISPOSAL

PROPOSED WORK

Ark., Malvern—Sewer Dist. 17, c/o R. E. Van Dusen, Malvern, sewer imprvs. $25,000. Seeking FWA funds. F. A. Niglis, Malvern, engr.

†Conn., Bridgeport—P. Wks. Dpt., City Hall, bids soon, Contr. 9, Sect. 4, trunk and storm sewer, Water St., Conn. 6-107. H. L. Rowland, City Hall, engr.

†Neb., Geneva—City, B. A. Lynn, clk., enlarging sewage plant, water and sewer line extens. $25,000. FWA gr. approved. R. Fulton, 2237 S. 19 St., Lincoln, engr.

O., Youngstown—Garbage incinerator, Cedar St. $175,000. R. W. O'Neill, city engr.

†Texas—U. S. Eng., Fort Sam Houston, sewage distr. plant alterations, imprvs., Bexar Co.

Wash., Pasco—City, sewerage sys. exten. $150,000. Baar & Cunningham, Spalding Bldg., Portland, Ore., engrs.

Ont., Toronto—Bd. Control, E. J. Conboy, mayor, lane sewers in 2 locations. $25,800. R. C. Harris, c/o owner, engr.

BIDS ASKED

Bids Asked December 7

N. Y., Kew Gardens—President Queens Boro, Queens Boro Hall, 120-55 Queens Blvd., Zone 15, combined sewer, appurtenances, Tryon Pl., Jewell Ave., 161, 152, 160, 165, 166 and 167 Sts., Third Ward; 164 St. and 164 Pl., combined sewer 78 and 112 Sts.; sanitary sewer, appurtenances, 177 (Kirkland) St., 139, 157, Terry Sts., Baisley and Foch Blvds., in 4th Ward; 127 St. and 9 Ave., 3rd Ward; 63 (Marion) Ave.

Bids Asked December 8

†Okla., Midwest City — Federal Works Agency, 810 Electric Bldg., Fort Worth, Tex., sewage disposal plant. $25,000. Plans deposit $10.

Bids Asked December 9

†N. C., Wrightsville Beach—Town, sewer imprvs. $194,600. **FWA.** Plans deposit $5. Tentative date. P. M. Van Camp, Southern Pines, engr. CD 10/19—ENR 10/21.

Bids Asked December 10

†Md., Aberdeen—Federal Works Agency, 601 State Planters Bank Bldg., Richmond, 19, Va., rehabilitating abandoned sewage disposal plant, Md. 18-195. $24,300. Whitman, Requardt & Smith, 1304 St. Paul St., Baltimore, consult. engrs. CD 10/6—ENR 10/14.

Bids Asked December 14

†Alabama—U. S. Eng., Grant St. west of Westwood St., Mobile, exten. sewage, water and electrical distr. sys., Inv. 01-076-44-150, Calhoun Co. $35,000.

†La., Benton—D. W. Brownlee, secy. Bossier Parish Police Jury, Courthouse, sewer imprvs., La. 16-194. $95,000. **FWA.** Plans deposit $25. T. L. Tatum, Levy Bldg., Shreveport, engr. CD 11/5—ENR 11/11.

†Va., Norfolk—Federal Works Agency, 601 State Planters Bank Bldg., Richmond, Zone 19, subaqueous outfall sewer Va. 44-325. $290,000. Plans deposit $5. Greeley & Hansen, Adams Bldg., consult. engrs.

Bids Asked December 17

†O., Euclid—M. O. Spino, dir. P. Service, 585 E. 222 St., sewer line from E. 222 St. and Lake Shore Blvd. to sewage disposal plant. $81,900. **FWA.** F. A. Thomas, city engr. CD 8/25—ENR 9/2.

Bids Asked After January 1

†Colo., Lakewood — Lakewood Sanitation Dist., about 5 mi. vitr. clay sanitary sewer line, $375,000. **FWA.** Prouty Bros. Eng. Co., Mining Exchange Bldg., Denver, engrs. CD 11/4—ENR 11/11.

LOW BIDDERS

†Louisiana—Bd. Supervs. Sewer Dist. 1 of Jefferson Parish, 600 Helois Ave., Metairie, Nov. 16, repairing sanitary sewerage sys., La. 16-244, Jefferson Parish from Clement Betpouey, Jr. & Co., 2701 Bruxelles St., New Orleans, **$54,886. FWA.** CD 11/3—ENR 11/4.

†Mich., Roseville — Village, 27700 Gratiot Ave., Nov. 22, sewer, Contr. 1, Mich. 20-323, from Arcari Constr. Co., 15100 Goddard Rd., Allen Park, **$217,297. FWA.** CD 11/17.

Wis., Blair—Village, sewers, from Standard Constr. Co., 2819 W. 3 St., Duluth, Minn., **$24,556.** S. P. Hall, 418 Lincoln Ave., Eau Claire, engr.

CONTRACTS AWARDED

Calif., Hemet—Ryan School of Aeronautics, Hemet, sewage collection and disposal sys., and water supply addn., to Flotation Systems, Inc., 4031 Goodwin Ave., Los Angeles, **$47,639.** Awarded 11/23. CD 11/1—ENR 11/4.

†Connecticut—U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., sewage treatment plant addn., No. 44/60, Hartford Co., to Caye Constr. Co., Inc., 356 Fulton St., Brooklyn, N. Y. Est. under **$50,000.** Bids 11/22. CD 11/18.

†Ind., Tell City—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., 7 sludge removal units, NOY 7267, to Maxon Constr. Co., 131 N. Ludlow St., Dayton, O., **$412,000.**

†Massachusetts—U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., storehouse addn., sewage disposal plant, No. 44/59, Dukes Co., to Frankini Constr. Co., 30 Mystic Ave., Medford. Est. **$50,000-$100,000.** Bids 11/12.

Mich., Roseville—Village, 27770 Gratiot Ave., sewer, Contr. 1R, to Waterway Constr. Co., Box 163, Redford Station, Detroit, **$27,324.** H. R. O'Mara, 2220 National Bank Bldg., Detroit, engrs.

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SEWERS and WASTES DISPOSAL (Contracts Awarded, Contd.)

†New Jersey—U. S. Eng., 120 Wall St., New York, 5, N. Y., sludge drying beds, Middlesex Co., to Carl Buhr Co., 1714 Grand Central Terminal, New York, N. Y., **$25,000.**

Tenn., Jackson—Madison Co., c/o Judge A. Widle, Courthouse, exten. storm drainage sys., relocating boundary lights of airport, to Bower & Johnson, First National Bank Bldg., **$40,000.**

†Tex., Groves—Jefferson Co. Water Control & Imprvt. Dist. 1, L. T. Dill, pres., sanitary sewerage sys. addn., imprvs., Tex. 41-597, to O. B. Cook, c/o J. B. Converse & Co., engrs., Port Arthur, approx. **$76,600. FWA.** CD 11/4.

BRIDGES

PROPOSED WORK

Colorado—State Hy. Dpt., Denver, pedestrian overpass over Colorado and Southern, Moffat Railroad and Denver & Rio Grande Western R.R. on W. 43 Ave., Denver, Denver Co. Railroad furnish material.

BIDS ASKED

Bids Asked December 8

Delaware—State Hy. Comn., Dover, timber piling, Contr. 833, Sussex Co.

Bids Asked December 15

California—State Div. Hys., Sacramento repairing three bridges across Torre Canyon, Vicente and Limekiln Creeks between 38 and 56 mi. south of Monterey, Monterey Co. G. T. McCoy, state hy. engr.

LOW BIDDERS

Tennessee—State Hy. Dpt., Nashville, Nov. 26, imprv. bridge over Hiwassee River, Polk Co., from C. A. Thompson, Centerville, **$31,027.** CD 11/8—ENR 11/11.

Wash., Tacoma—City, City Hall, Nov. 22, rein.-con. bridge on Eatonville-Alder Rd., from Rumsey & Co., 3821 Airport Way, Seattle, Zone 8, **$35,983.** CD 5/19—ENR 5/27.

CONTRACTS AWARDED

Ia., Dubuque — City of Dubuque Bridge Comn., removal old hy. bridge across Mississippi River to M. E. Souther, Inc., 1528 Branston St., St. Paul, 8, Minn., **$30,000.**

★ **Tex., Langtry**—Southern Pacific Lines, R. W. Barnes, ch. engr., 916 Southern Pacific Bldg., Houston, steel superstructure for single track railway bridge over Pecos River to Bethlehem Steel Co., Behlehem, Pa., approx. **$900,000.** CD 9/16—ENR 9/23.

Washington—State Hy. Dpt., Olympia, 308 ft. rein.-con. arch bridge, approaches over Jim Creek, 223 ft. untreated timber bridge over Johnson Creek and 8x8 ft. box culvert at Colvin Creek, Cowlitz Co., to Macri & Co., 905 10 Ave. S, Seattle, **$124,381.** B. Bantz state hy. dir. Bids 11/23. CD 11/10.

STREETS AND ROADS

BIDS ASKED

Bids Asked December 8

Louisiana—D. Y. Smith, dir. Dpt. Hys, Baton Rouge, 1,085 cu. yd. washed gravel and 10,205 cu. yd. iron ore surfacing furnished, spot dumped on certain roads, S.P. 703-00-41, Wards 1 to 7 (inclusive), Jackson Parish.

Bids Asked December 10

Kentucky—State Hy. Dpt., Frankfort, grading, draining, low type surfacing 1.155 mi. Grahn-Pleasant Valley Rd., beginning at Grahn and extend. to bridge over Little Sinking Creek, SP 22-28, Carter Co.; constructing sidewalk 0.38 mi. from Duffy Ave. to school bldg., Lebanon Ave., in Campbellsville, SP 109-8, Taylor Co.

Bids Asked December 11

†Ga., Dublin—Officer in Charge of Construction, U. S. Naval Hospital, (selected list bidders) roads, walks, water distr. sys., storm and sanitary sewerage sys., electrical distr. sys., street lighting, sewage disposal plant, incinerator, soil erosion prevention, Spec. 11832.

Bids Asked

Nebraska—State Dpt. Rd. & Irrigation, Lincoln, rejected bids Nov. 24, grading, culverts, State Rd. 286-C, Bristow-Lynch. CD 11/16—ENR 11/18, under Bridges, etc.

LOW BIDDERS

Calif., Lancaster—Aircraft Industries Co., 1224 Airway Dr., Glendale, Nov. 20, 2 in. asphaltic concrete paving 600x600 ft. area, from Ed. L. Thornburg, 8941 Santa Monica Blvd., Los Angeles, **$75,537.**

Louisiana—State Hy. Dpt., Baton Rouge, Nov. 24, imprv. 0.726 mi. Vernon Parish from W. R. Aldrich & Co., Kalwrah University Gardens, Baton Rouge, **$31,155.** CD 11/19.

Md., Baltimore—City, Bd. Awards, City Hall, Nov. 26, asphalt paving Cold Spring Lane, from P. Flanigan Sons, 2405 Loch Raven Blvd., **$41,923.** CD 11/19.

STREETS and ROADS (Low Bidders, Cont'd.)

Tennessee—State Hy. Dpt., Nashville, Nov. 26, imprv. 4.926 mi. Rutherford Co., from Weymouth Constr. Co., Box 162, Tullahoma, **$396,676**; 3.333 mi. Knox Co., from Stacy Bros. Co., Johnson City, **$148,703.** CD 11/8—ENR 11/11.

Washington—State Hy. Dpt., Olympia, Nov. 23, imprv. 14.801 mi. Clallam Co., from Sound Constr. & Engineering Co., Northern Life Tower, Seattle, Zone 1, **$75,553.** Received no bids Nov. 23, imprv. 0.98 mi. Skagit Co. CD 11/10.

Wash., Seattle—Bd. P. Wks., County-City Bldg., Zone 4, paving Occidental Ave., from Queen City Constr. Co., 603 18 Ave. S., Zone 44, **$42,314.** Bids 11/24. C. L. Wartelle, city engr.

CONTRACTS AWARDED

Arizona—Phelps-Dodge Copper Corp., Douglas, access roads at proposed Horseshoe Dam on Verde River, Phoenix, to Phoenix-Temple Stone Co., P. O. Box 1670, Phoenix, approx. **$50,000.** Leeds, Hill, Barnard & Jewett, 601 W. 5 St., Los Angeles, Calif., engrs.

†California—H. J. Kaiser Co., Richmond, road repairs on Richmond Ave., Shipyard 3, to L. J. Immel, Box 65, Station A, Berkeley. Federally financed.

†Florida—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, access roads, Neg-Jax-44-323, Levy Co., to W. H. Armston, Inc., Dunedin, **$70,629. Awarded 11/22.**

Idaho—State Dpt. P. Wks., Bureau Hys., Boise, furnishing crushed gravel and cover coat material in stockpiles adjacent to Boise Valley, Nampa-Murphy, Black Canyon and Emmett-New Plymouth Hys., Ada, Canyon and Gem Counties, to Lobnitz Brothers, Sonna Bldg., Boise, **$32,200.** Est. $49,500. Bids 11/12.

†North Carolina—U. S. Eng., 308 Customhouse, Wilmington, stabilizing service roads, Iden. 31-075-44-55, Guilford Co., to Bryant Electric Co., High Point, under **$50,000.** Bids 11/4.

★**Ohio**—State Hy. Dpt., Columbus, imprv. 2.53 mi. Brown Co., to Mauger Constr. Co., 8 E. Long St., Columbus, **$540,082,** est. $646,800***0.313 mi. Lucas Co., to Launder & Son, Inc., P. O. Stat. B, Box 6, Toledo, **$41,322,** est. $41,600***2.818 mi. Summit Co., to A. J. Baltes, Inc., 11 Olive St., Norwalk, **$303,396,** est. $354,200***0.990 mi. Stark Co., to H. H. Wise, 1126 11 St., N.W., Canton, **$39,360,** est. $40,400. Grand total $924,160. Bids 11/16. Cancelled bids to have been opened Nov. 16, imprv. 2.083 mi. Huron Co. CD 11/3—ENR 11/11.

O., St. Clairsville—Bd. Comrs. Belmont Co., imprv. Sect. C, Deep Run Rd., Pease Twp., to Tri-State Asphalt Corp., S. Broadway, Martins Ferry, **$34,884.** Est. over $35,000. G. C. Travis, St. Clairsville, co. engr.

Oklahoma—State Hy. Dpt., Oklahoma City, grading, reshaping, asphalt surfacing 9.5 mi. State Hy. 36, and grading, drainage, gravel surfacing 16.186 mi. State Hy. 36 from Red River north to Grandfield, both Tillman Co., to Lewis & Co., 507 Surety Bldg., Muskogee, **$121,124** and **$51,789** respectively, est. $168,115 and $57,629 respectively***7.2 mi. closure road at Naval Ammunition Depot, Pittsburg Co., to R. K. Lawson, Yukon, **$92,285,** est. $95,515 ***grading, drainage, surfacing 4.006 mi. on farm to market road, Pittsburg Co., to Standard Paving Co., 2119 E. 11 St., Tulsa, **$54,879,** est. $58,579. Grand total $320,077. Bid 11/16, awarded 11/24. B. E. Clark, state hy. engr.

†Okla., Fort Sill (Ind. br. Lawton)—U. S. Eng., 231 W. Main St., Denison, Tex., access roads, Contr. 41-242-Eng-37, to A. C. Shelton & Son, Lawton, **$101,516.**

†Pa., New Cumberland—U. S. Eng., Standard Oil Bldg., Baltimore, Md., paving, A S F depot, Contr. 18-020-Eng-159, to H. J. Williams Co., Inc., York, **$64,583.**

†Va., Fort Belvoir—U. S. Eng., 1 and Douglas Sts. N.W., Wash., D. C., access roads, Contr. 49-080-Eng-35, Fort Belvoir, to Kent Co., Richmond, **$105,058.**

†Wash., Spokane—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., surfacing access road, Naval Supply Depot, NOY 8275, to Inland Asphalt Co., 10 and Havana Sts.

Wyoming—State Hy. Comn., Cheyenne, imprv. 7.245 mi. Hot Springs Co., to Big Horn Constr. Co., Sheridan, **$83,870.** Bids 11/19. CD 11/12.

★**Quebec**—Dpt. Roads, A. Bergeron, deputy minister, Quebec City, grading, gravelling 13.9 mi. Hy. 8, between Pointe au Chene and Papineauville, to H. J. O'Connell, Ltd., 606 Cathcart St., Montreal, about **$1,500,000.** CD 9/23.

EARTHWORK, WATERWAYS

PROPOSED WORK

★**Arizona**—Phelps Dodge Copper Corp., Corp., Douglas, rock fill or rolled earth and fill Horseshoe Dam on Verde River $1,500,000-$2,000,000; pump. plant, small diversion dam and 3 to 5 mi. metal pipeline on Black River, over $15,000. Leeds, Hill, Barnard & Jewett, 60 W. 5 St., Los Angeles, Calif, engrs.

†Florida—U. S. Eng., Grant St. west of Westwood St., Mobile, Ala., imprvs. to Pensacola Harbor, Santa Rosa Co. $162,000.

★**†Montana**—U. S. Eng., 32 Exchange Pl., Salt Lake City, Utah, dam at south fork of Flathead Lake to impound 1,000,000 acre feet water, Flathead Co. $2,000,000.

Egypt — Egyptian Government, Reservoirs Dpt. Pub. Wks. Ministry, Cairo, soon takes bids remodeling Esna Barrage across the Nile in upper Egypt, comprising building about 250,000 cu. metres masonry, addns. and extens. of substructure of Barrage and altering locks. Drawings, contract and specifications are now being drawn up and can be inspected shortly at Egyptian Legation, 2301 Massachusetts Ave. N.W., Wash., D. C., Royal Egyptian Embassy, in London, England, and at office Sir Murdoch MacDonald and partners, 72 Victoria St., London, S. W. I, England, consult. engrs; adv. ENR 12/2.

BIDS ASKED

Bids Asked December 7

N. Y., New York—Comr. Marine & Aviation, Pier A, foot of Battery Pl., North River, Zone 4, dredging at foot of E. 136 St., East River, Bronx Boro, Contr. 2393. Plans deposit $1.25.

Bids Asked December 15

La., East Point—Bd. Comm. 19th Louisiana Levee & Drainage Dist., channel clearing approx. 3.532 mi. Four Mile Bayou Canal, Red River Parish, Dpt. Pub. Wks., Capital Bldg., Baton Rouge, engr.

Bids Asked December 22

†California—Bureau of Reclamation, Friant, earthwork and structures, station 1050 plus 75 to station 1926 plus 90, Madera Canal, Friant Div., Central Valley Proj., Spec. 1061. Extenaed date. CD 11/16—ENR 11/18.

LOW BIDDERS

California—State Div. Water Resources, 808 State Bldg., Los Angeles, Nov. 23, dredging, rock jetty constr., Alamitos Bay, from Shannahan Bros., 6193 Maywood Ave., Huntington Park, **$199,904.** CD 11/8—ENR 11/11.

Calif., Long Beach—Los Angeles Co., Hall of Records, Los Angeles, 800 ft. sand core, rock levee upstream from Ocean Blvd. Bridge in San Gabriel River Outlet, near here, from Shannahan Bros., 6193 Maywood Ave., Huntington Park, **$109,520.** M. E. Salsbury, 751 S. Figueroa St., Los Angeles, and Ch. Engr. Los Angeles Co. Flood Control Dist., engrs.

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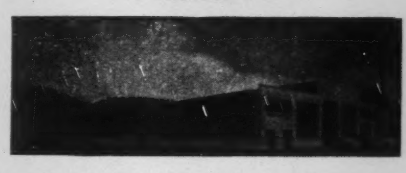

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EARTHWORK and WATERWAYS (Cont'd.)

CONTRACTS AWARDED

Arizona—Phelps-Dodge Copper Corp., Douglas, cleaning out diversion tunnel and establishing camp at site of proposed Horseshoe Dam, on Verde River, to Vinson & Pringle, P. O. Box 930, Phoenix, approx. **$50,000.**

†Arkansas—U. S. Eng., U. S. Post Office & Courthouse, Vicksburg, Miss., approx. 90,000 yd. earth work, Sol. 22-052-44-29, Desha Co., to Pioneer Contracting Co., Dyersburg, Tenn., approx. **$38,000.** CD 10/12—ENR 10/14.

†Arkansas—U. S. Eng., U. S. Post Office & Courthouse, Vicksburg, Miss., approx. 243,000 cu. yd. earthwork on South Bank Arkansas River, Sol. 22-052-44-24, Jefferson Co., to Hughes Constr. Co., Rohwer, approx. **$86,000.** CD 9/29—ENR 10/7.

†California—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, drainage facilities, No. 266, Riverside Co., to Rd. R. Siple, 2545 San Fernando Rd., Los Angeles, **$10,000-$20,000.**

†Connecticut — U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., dredging, No. 445, Middlesex Co., to American Hydraulic Dredging Co., 86 River St., Quincy, Mass. Est. under **$50,000.** Bids 8/7. CD 8/6.

†Maine—U. S. Eng., 31 St. James Ave., Boston, Mass., trenching, No. 19-023-44-NEG 108, Penobscot Co., to J. R. Cianchette, 120 Main St., Pittsfield, **$15,855.** Bids 11/12. CD 11/9.

†Massachusetts—U. S. Eng., 31 St. James Ave., Boston, dredging, No. 19-023-44-NEG 113, to Bay State Dredging & Contracting Co., 62 Condor St., East Boston. Est. **$40,000.** Bids 11/19. CD 11/15.

†Mississippi—U. S. Eng., U. S. Post Office & Courthouse, Vicksburg, approx. 92,000 cu. yd. earthwork on east bank of Mississippi River, Solic. No. 22-052-44-38, Washington Co., to H. N. Rogers & Sons Co., 62 S. Front St., Memphis, Tenn., approx. **$28,000.**

†Texas—U. S. Eng., 25 St. and Avenue F, Galveston, dredging Intracoastal Canal, Matagorda Co., to Jahncke Service Co., 814 Howard Ave., New Orleans, La., approx. **$79,000.**

UNCLASSIFIED

PROPOSED WORK

†California—SHIPYARD BUILDING—H. J. Kaiser Co., Richmond, Central Warehouse No. A, Shipyard 2, to Moore & Roberts, 693 Mission St., San Francisco. Federally financed. W. G. Corlett & A. W. Anderson, Bank of America Bldg., Oakland, archts.

Conn., New Britain—SWIMMING AND WADING POOLS—City Dpt. Parks, City Hall, 50x125 ft., rein.-con. swimming pool and 50x50 ft., wading pool, $60,000.

Fla., Jacksonville—DOCKS. etc.—Bids soon imprv. docks, facilities, Talleyrand Ave. Approx. $75,000. W. E. Shedden, City engr.

†Ill., Rockford—AIRPORT—City, approved construction airport. CAA. CD 10/6—ENR 10/14.

★ **Montana**—TUNNEL—Northern Pacific Ry. Co., B. Blum, ch. engr., 176 E. 5 St., St. Paul, Minn., bids soon tunnel through Bozeman Pass between Livingston and Bozeman. $1,000,000. CD 9/24—ENR 9/30, under Bozeman.

†Nev., Fallon—AIR STATION—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., engineer-architect services by C. C. Kennedy, 604 Mission St., San Francisco, Calif., auxiliary air station, NOY 8298.

Ohio — PIPELINE — Sinclair Refining Co., 525 W. First Ave., E. B. Voorhees, right-of-way agent, Columbus, 135 mi. pipeline from Toledo to Columbus. Over $25,000.

†Oregon — AIRFIELD — Civil Aeronautics Admin., Smith Tower, Seattle, 4, Wash., airfield with 2 runways, on west coast.

†Texas—IMPROVEMENTS—U. S. Eng., Albuquerque, N. M., imprvs., addnl. construction, bldg., Sol. W29-005-Eng-44-92, Ward Co.

†Texas—IMPROVEMENTS—U. S Eng., 416 Wright Bldg., Tulsa, 2, Okla., imprvs., bldgs., etc., Sol. 34-066-44-25 Gray Co.

Tenn., Clarksville—SUBSTATION—Tennessee Valley Auth., Knoxville, electrical substation. Over $25,000.

BIDS ASKED

Bids Asked In December

★ **†Ia., Waterloo**—AIRPORT—City, K. Matthews, clk., municipal airport. $1,000,000. CAA. CD 6/18—ENR 6/28.

La., Lake Charles — IMPROVEMENTS — Calcasieu Parish Police Jury, imprvs., addnl. bldgs., facilities. Plans deposit $10. Dunn & Quinn, P. O. Box 483, archts.

Delaware—GROINS—State Hy. Dpt., Dover, F. V. duPont, chn., Contr. 833, Slaughter Beach Groins, Slaughter Beach, Sussex Co. Plans deposit $2. W. W. Mack, Dover, ch. engr.

Bids Asked December 10

†Georgia—IMPROVEMENTS—U. S. Eng., Post Office Bldg., Savannah, imprvs., paving, Houston Co.

Bids Asked December 14

†Alabama—IMPROVEMENTS—U. S. Eng., Grant St. west of Westwood St., Mobile, imprvs., reclamation yard around existing bldg., incl. grading, surface course and fencing, Inv. 01-076-44-203. Mobile Co.

Mass., East Boston (Sta. Boston)—AIRPORT IMPROVEMENTS—Dpt. P. Wks., 100 Nashua St., Boston, dredging, placing material for filling by hydraulic process for constr. embankments C and D for proposed runways at General Lawrence Logan Airport. H. A. MacDonald, comr. CD 11/12—ENR 11/18.

Bids Asked December 15

†Mississippi—IMPROVEMENTS—U. S. Eng., Grant St., west of Westwood St., Mobile, Ala., imprvs., Lauderdale Co.

†W. Va., Wheeling—AIRPORT GRADING, etc.—Bd. Comrs. Ohio Co., Wheeling, grading, paving airport. CAA. A. H. Wessel, 106 6 St., Pittsburgh, Pa., engr.

LOW BIDDERS

†Arizona—IMPROVEMENTS—U. S. Eng., 751 S. Figueroa St., Los Angeles, 14, Calif., Nov. 23, imprvs., bldg. alterations, No. 303, Cochise Co., from Arch Rib Truss Co., 4819 Exposition Blvd., Los Angeles, Calif., **$60,000-$70,000.**

Calif., Los Angeles—COOLING WATER INTAKE STRUCTURES, etc.—Dpt. Water & Power, 207 S. Bway., Zone 12, Nov. 23, cooling water intake structures and tunnels at Seal Beach Steam Power Plant, Spec. 8861, from Guy F. Atkinson Co., 310 Heartwell Bldg., Long Beach, **$243,297.** CD 8/13—ENR 8/19.

Calif., San Francisco—RAIL SALVAGE, etc.—City Dpt., P. Wks., City Hall, Nov. 24, rail salvage, street pavement repair Guerrero St., etc., from Eaton & Smith, 715 Ocean Ave., **$113,225.** Est. $93,142. CD 11/16.

†Colorado—IMPROVEMENTS—U. S. Eng., 909 17 St., Denver, imprvs., bldg., Otero Co., from M. E. Carlson, 4483 Newton St., Denver, approx. **$25,000.**

†Maine—IMPROVEMENTS—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., Nov. 24, imprvs., Spec. 12476, from Stewart & Williams, 185 Water St., Augusta, **$153,985.** CD 11/17.

†S. C., Camden—AIRPORT—Civil Aeronautics Admin., 84 Marietta St., Atlanta, Ga., Nov. 24, airport, Proposal 24-110, from J. Monohan, Pelham, Ga., **$417,161.** CD 11/15—ENR 11/18.

★ **†Texas**—IMPROVEMENTS—U. S. Eng., 231 W. Main St., Denison, Nov. 23, imprvs., drainage, asphalt paving, Sol. 41-244-117, Dallas Co., from Texas Bitulithic Co., 111 W. Commerce St., Dallas, **$910,000.** CD 11/17—ENR 11/25, under BA.

†Texas—FIRING-IN RANGES—U. S. Eng., 25 St. and Ave. F, Galveston, firing-in ranges, 30,000 cu. yd. excav., Sol. 41-243-44-C55, Matagorda Co., from Joe Bland Constr. Co., P. O. Box 1158, Austin approx. **$80,000.** CD 10/20—ENR 10/28.

Ont., Yarmouth Centre — AERODROME — Dpt. National Defense for Air, Ottawa. 1 single landplane hangar, N. C. O's quarters, link trainer bldg. addnl accomodation bldg., at aerodrome, from Sterling Constr. Co. Ltd., 2494 Sandwich St. E. Windsor, about **$110,000.**

CONTRACTS AWARDED

†Arizona — IMPROVEMENTS — U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, imprvs., parking apron, etc., No. 314, Pima Co., to Arizona United Constructors, P. O. Box 1522, Phoenix. Est. over **$25,000.**

†California—IMPROVEMENTS—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, imprvs., electrical distr. and storm drain, No. 275, Los Angeles Co., to Rob. E. McKee, 4700 San Fernando Rd., West, Los Angeles, **$40,000-$50,000.**

California—SHIPYARD BUILDING—Permanente Metals Corp., c/o Richmond Shipyard 4, Richmond, fittings office bldg., Shipyard 2, to E. J. Freethy, 1432 Kearney St., El Cerrito. Est. **$150,000.**

†California — STORAGE TRACKS — U. S. Eng., 74 New Montgomery St., San Francisco, storage tracks, Spec. 1209, San Francisco Co., to Granite Constr. Co., Box 900, Watsonville. Est. over **$30,000.** Awarded 11/18.

†Calif., Fairfield—AIRFIELD BLDGS.—U. E. Eng., 1209 8 St., Sacramento, Zone 8, addnl. bldgs., Fairfield-Suisun Air Field, near here, Calif. 04-167-Eng-147, to MacDonald & Kahn, Inc., 200 Financial Center Bldg., San Francisco, **$253,430.**

†Calif., Fairfield—TAXIWAYS—U. S. Eng., 1209 8 St., Sacramento, Zone 8, taxiways, Fairfield-Suisun, near here, Contr. 04-167-eng-178, to J. A. Casson Co. & N. M. Ball Sons, Hayward, **$33,466.**

†Calif., Gardner Field (Br. Taft)—FACILITIES, etc.—U. S. Eng., 1209 8 St., Sacramento, Zone 8, facilities and temporary frame bldgs. Contr. 04-167-Eng-165, to G. E. Hall, Bakersfield, **$24,600.**

†Calif., Hamilton Field—FACILITIES—U. S. Eng., 74 New Montgomery St., San Francisco, addnl. facilities, Contr. 04-203-eng-354, to G. W. Williams Co., Burlingame, **$100,490.**

Calif., Richmond—RAILROAD TRACK—Permanente Metals Corp., Richmond. 3,985 ft. railroad track and 285 ft. relocation existing track, at Shipyard 2, to A. E. Downer, 1429 N. Baker St., Stockton. CD 11/11—ENR 11/18.

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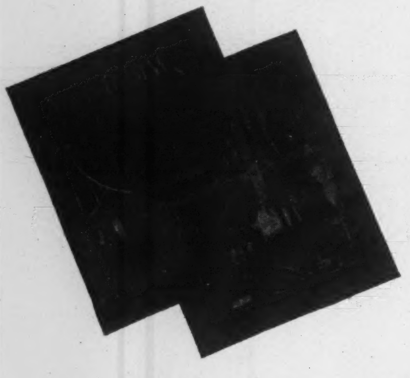

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†Colo., Buckley Field (br. Denver)—FACILITIES—U. S. Eng., 909 17 St., Denver, facilities, Contr. 05-016-Eng-85, to N. G. Petry, Denham Bldg., Denver, $33,448.

†Florida—RUNWAYS EXTENSIONS, etc.—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, runways extens. and taxiways, Neg-Jax-44-330, Alachua Co., to John Monagham, Inc., Pelham, Ga., approx. $100,000. Awarded 11/12.

†Florida—HEATING SYSTEMS—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, warm air heating sys., Neg-Jax-44-350, Orange Co., to Stevens & Sipple, 1920 N. Orange Ave., Orlando, $32,252. Awarded 11/22.

†Fla., Drew Field (Br. Tampa)—TRAINING AIDS, etc.—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, training aids, course, pavement, drainage facilities, etc., Contr. 08-123-eng-120, to Ryan Constr. Co., Stovall Office Bldg., Tampa, $24,557.

†Fla., Panama City—AIRFIELD BLDG.—U. S. Eng., Grant St. west of Westwood St., Mobile, Ala., temporary frame bldg., Tyndall Field, Contr. 01-076-Eng-75, to Williams Constr. Co., Columbus, Ga., $43,597.

†Fla., Perry—CLEARING, GRUBBING, etc.—U. S. Eng., 575 Riverside Ave., Jacksonville, clearing, grubbing, excav., reconstructing fence, etc., Contr. 08-123-Eng-100, Perry Auxiliary Airfield, to J. B. Gibson Constr. Co., Donalsonville, Ga., $27,060.

†Fla., St. Augustine—RUNWAY SHOULDER STABILIZATION—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., runway shoulder stabilization, Auxiliary Air Field, NOY 7551, to Duval Eng. & Contg. Co., foot of E. Adams St., Jacksonville, $40,684.

†Fla., Tampa—CLEARING, GRUBBING, GRASSING, etc.—U. S. Eng., 575 Riverside Ave., Jacksonville, clearing, grubbing, grassing, etc., Contr. 08-123-Eng-114, Hillsborough Auxiliary Airfield, to Cone Bros. Contr. Co., Caesar & Cumberland Rds., Tampa, $56,925.

†Fla., Tyndall Field—FACILITIES, etc.—U. S. Eng., Grant St. west of Westwood St., Mobile, Ala., facilities, utilities, Contr. 01-076-Eng-73, to Royce Kershaw & Co., Montgomery, Ala., $65,992.

†Ga., Chatham Field (Br. Savannah)—CLEARING, GRUBBING, etc.—U. S. Eng., Post Office Bldg., Savannah, clearing, grubbing, grading, paving, Contr. 09-133-eng-3, to C. M. Lyle Constr. Co., Gainesville, $57,324.

†Ga., Robins Field (Br. Macon)—FACILITIES—U. S. Eng., Post Office Bldg., Savannah, addnl. facilities, Contr. 819-eng-1690, to A. R. Briggs Constr. Co., Macon, $35,500.

†Ga., Waycress — CONSTRUCTION — U. S. Eng., Post Office Bldg., Savannah, addnl. construction, Contr. 09-133-eng-5, Waycress Airfield, to Christian & Bell Co., 101 Marietta St., Atlanta, Ga., $86,659.

†Idaho, Mountain Home—RANGE—U. S. Eng., 628 Pittock Blk., S.W. 10 Ave. and Washington St., Portland, Ore., range, Contr. 35-026-Eng-360, Mt. Home A. Airfield, to J. Nottingham, 329 Grove St., Boise, $26,770.

†Iowa—IMPROVEMENTS—U. S. Eng., 1709 Jackson St., Omaha, Neb., imprvs., concrete paving, to Jensen & Krage, 209 Wright Bldg., Sioux City. Est. under $50,000.

★ **†Kansas**—IMPROVEMENTS—U. S. Eng., 10 E. 17 St., Kansas City, Mo., imprvs., addnl. bldgs., Douglas Co., to Peter Kiewit Sons Co., 1024 Omaha Natl. Bank Bldg., Omaha, Neb. Est. $500,000.

†Kansas—LIGHTING SYSTEM—U. S. Eng., 10 E. 17 St., Kansas City, Mo., night lighting sys., Barton Co., to Weddell-Shrum Elec. Co., Great Bend. Est. $39,000.

†Kan., Topeka — AIRFIELD MODIFICATIONS—U. S. Eng., 10 E. 17 St., Kansas City, Mo., modifications, army airfield, Contr. 23-028-Eng-202, to Geo. Senne & Co., 510 E. 15 St., Topeka, $50,700.

†Louisiana—IMPROVEMENTS—U. S. Eng., 25 St. and Avenue F, Galveston, Tex., imprvs., Sol. No. 41-243-44-C84, Vernon Parish, to Werner Co., 1320 Pierre Ave., Shreveport, $25,000. Bids 11/17.

†Maryland--HANGAR—Glenn L. Martin Co., Middle River, 1 story, 200x300 ft. hangar bldg., to Consolidated Engineering Co., 20 E. Franklin St., Baltimore. Est. $250,000 plus. Federally financed. Bids 11/23. CD 11/19.

†Maryland—LIGHTING—U. S. Eng., Standard Oil Bldg., Baltimore, night lighting, Prince Georges Co., to Cummins Constr. Corp., 803 Cathedral St., Baltimore, $91,100.

†Miss., Camp Shelby—FACILITIES—U. S. Eng., Grant St., west Westwood St., Mobile Ala., addnl. facilities, Contr. 01-076-Eng-86, to W. J. Reiley, Monroe, La., $48,273.

†Nebraska—IMPROVEMENTS—U. S. Eng., 1709 Jackson St., Omaha, imprvs., concrete paving, Clay Co., to Roberts Const. Co., 1018 Terminal Bldg., Lincoln. Est. under $50,000.

†Nebraska—IMPROVEMENTS—U. S. Eng., 1709 Jackson St., Omaha, imprvs., concrete pavement, Hall Co., to Diamond Eng. Co., Grand Island. Est. under $50,000.

†Nebraska—IMPROVEMENTS—U. S. Eng., 1709 Jackson St., Omaha, imprvs., concrete paving, Lancaster Co., to Roberts Constr. Co., 1018 Terminal Bldg., Lincoln. Est. under $50,000.

UNCLASSIFIED (Contracts Awarded, Cont'd.)

†**Nev., Las Vegas**—TAXIWAYS—U. S. Eng., 751 Figueroa St., Los Angeles, 14, Calif., taxiways, A A F Gunnery School, Contr. 04-353-Eng-123, to Gibbons & Reed, 259 W. 35 St., Salt Lake City, Utah, **$52,919.**

†**N. J., Newark**—AIRPORT ALTERATION, etc.—U. S. Eng., 120 Wall St., New York, 5, N. Y., alteration, installation, Contr. 30-075-Eng-286, at Newark Airport, to Hansen-Jensen, Inc., 427 N. Broad St., Elizabeth, **$53,620.** Bids 11/15. CD 11/12.

†**N. M., Carlsbad**—NIGHT LIGHTING SYSTEM—U. S. Eng., 4 and Gold Sts., Albuquerque, installing night lighting sys., Carlsbad. A A F, Contr. 29-005-Eng-122, to H. M. Nicholson, 939 S. Bway., Los Angeles, Calif., **$43,457.** Bids 10/6. CD 9/29.

†**New York**—AIR STATION BLDG.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., automatic transportation garage, NAS, Floyd Bennett Field, NOY 7443, to Wm. A. Berbusse, Jr. Inc., 101 Park Ave., New York, **$48,253.**

†**N. Y., Camp Shanks**—FACILITIES—U. S. Eng., Orangeburg, facilities, Contr. 30-075-Eng-312, to W. A. Stanley, Starling Bldg., Ossining, **$110,607.**

†**North Carolina**—FENCE, etc.—U. S. Eng., 308 Customhouse, Wilmington, fence and gates, No. 38-081-44-82, Neg., Union Co., to Barger Bros., Mooresville, under **$50,000.** Bids 11/10.

†**North Carolina**—IMPROVEMENTS—U. S. Eng., 308 Customhouse, Wilmington, imprvs., Robeson Co., to Barger Bros., Mooresville, S. C., under **$50,000.**

†**North Carolina**—IMPROVEMENTS—U. S. Eng., 308 Customhouse, Wilmington, imprvs., paving, utilities, No. 38-081-44-76-Neg., Robeson Co., to Ballenger Paving Co., Greenville, S. C., under **$200,000.** Bids 11/11.

†**North Carolina**—IMPROVEMENTS—U. S. Eng., 308 Customhouse, Wilmington, imprvs., No. 38-081-44-79-Neg., Union Co., to Barger Bros., Mooresville, **$150,000-$200,000.** Bids 11/12.

†**North Carolina**—LIGHTING FACILITIES—U. S. Eng., 308 Customhouse, Wilmington, addnl. lighting facilities, Iden. 31-075-44-59, Cumberland Co., to All-State Electric Co., Winston-Salem, under **$50,000.** Bids 11/12.

†**North Carolina**—LIGHTING SYSTEM—U. S. Eng., 308 Customhouse, Wilmington, night lighting sys. modifications, addns. Iden. 31-075-44-56, Forsyth Co., to Kiker & Yount, Reidsville, under **$50,000.** Bids 11/8.

†**N. C., Camp Davis (br. Wilmington)**—GROUNDS EXPANSION—U. S. Eng., 308 Customhouse, Wilmington, expansion grounds, Contr. 31-075-Eng-63, to Lambeth & Hester, Greensboro, **$54,210.**

†**N. C., Maxton**—HANGARS—U. S. Eng., 33 Custom House, Charleston, S. C., hangars, Laurinburg-Maxton Army Air Base, Contr. 38-081-Eng. 64, to Barger Bros., Mooresville. **$24,600.**

†**Ohio**—IMPROVEMENTS—U. S. Eng., 700 Union Guardian Bldg., Detroit, 31, Mich., imprvs., Cuyahoga Co., to Lombardo Bros. Constr. Co., 1770 E. 11 St., Cleveland. Est. **$100,000.** Bids 11/13, awarded 11/23.

†**O., Marion**—STABILIZATION—U. S. Eng., 522 U. S. Post Office & Court House, Cincinnati, stabilization open area, Contr. No. 33-015-Eng-122, Marion Engr. Depot, to Ohio Engineering Co., Lorain, **$86,906.**

†**O., Patterson Field (br. Fairfield)**—AIRFIELD PAVING—U. S. Eng., Dayton, paving Patterson Field, Contr. 33-046-Eng-56, to J. J. Boyle & Co., 1744 N. Mozart St., Chicago, Ill. Est. **$80,919.**

†**Oklahoma**—FUEL OIL DISPENSING SYSTEM—U. S. Eng., 416 Wright Bldg., Tulsa, Zone 2, fuel oil dispensing sys., access asphalt paving, etc., Sol. No. 34-006-44-17, Muskogee Co., to Ottinger Bros., 901 Petroleum Bldg., Oklahoma City, approx. **$91,000.** CD 11/5—ENR 11/11.

†**Oklahoma**—SALVAGE YARD, etc.—U. S. Eng., 416 Wright Bldg.. Tulsa, Zone 2, salvage yard, exten. bldg., etc., Sol. 957-Neg-44-73, Oklahoma Co., to E. A. Lewellen, Petroleum Bldg., Oklahoma City, **$34,500.** Bids 9/25.

†**Okla., Ardmore**—AIRFIELD DRIVEWAYS, etc.—U. S. Eng., 231 W. Main St., Denison, Tex., driveways, parking areas, railroad, utilities, Contr. 41-242-Eng-62, Ardmore Auxiliary Airfield, to O. J. Parrott, 403 S. Haskell St., Dallas, Tex., **$25,747.**

†**Okla., Ardmore**—TRAINING AIDS—U. S. Eng., 231 W. Main St., Denison, Tex., training aids, Contr. 41-242-eng-79, at Ardmore A A, to Builders Constr. Co., Perrine Bldg., Oklahoma City, **$25,536.**

†**Pa., Reading**—PARKING AREAS, etc.—U. S. Eng., Standard Oil Bldg., Baltimore, Md., rehabilitating, relocating road, constructing parking areas, appurtenances, Reading A A B, Contr. 18-020-Eng-169, to H. Ray Miller, Lancaster. Est. **$42,266.**

†**Rhode Island**—FENCING—U. S. Eng., 819 Industrial Trust Bldg., Providence, fencing, No. 44/61, Kent Co., to Constantino Bros., 335 Hartford Ave., Providence. Est. under **$25,000.** CD 11/18—ENR 11/25.

†**South Carolina**—MAIN ENTRANCE—U. S. Eng., 33 Customhouse, Charleston, main entrance, No. 28-081-44-80-Neg., Charleston Co., to Harter & Rhuel, Lake City, under **$50,000.** Bids 11/11.

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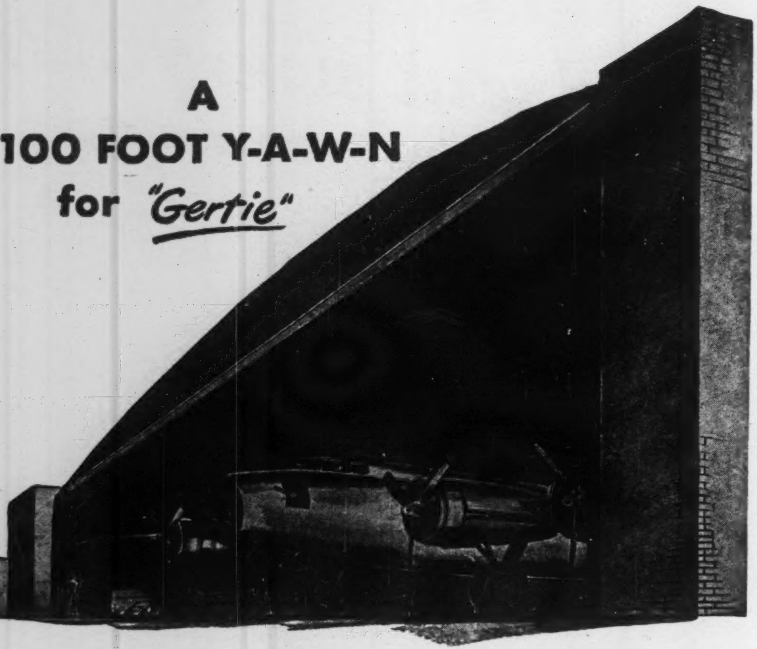

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UNCLASSIFIED (Contracts Awarded, Cont'd.)

†Tenn., Memphis—AIR STATION BLDG.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., ships store, NAS, NOY 6801, to Dunn Constr. Co., Inc., and Polk-Smartt Paving Co., Millington, **$74,175.**

†Texas—FUELING SYSTEM—U. S. Eng., 416 Wright Bldg., Tulsa, 2, Okla., fueling sys., addns., expansion, Sol. 34-066-44-3, Gray Co., to Natkin & Co., 1800 Baltimore St., Kansas City, Mo., approx. **$27,700.** Awarded 11/16.

†Texas—IMPROVEMENTS—U. S. Eng., 416 Wright Bldg., Tulsa 2, Okla., imprvs., bldgs., Gray Co., to Johnson, Burns & Kraft, W. Noble St., Oklahoma City, Okla., approx. **$25,000.**

†Texas—IMPROVEMENTS—U. S. Eng., Fort Sam Houston, imprvs., Brown Co., to R. D. Kitchens, 2717 Austin Ave., Brownwood, approx. **$25,000.** CD 11/18—ENR 11/25, under Public Bldgs.

†Texas—IMPROVEMENTS—U. S. Eng., 25 St. and Ave. F, Galveston, imprvs., addns., modifications, Sol. 41-243-44-C85, Harris Co., to Brown Constr. Co., P. O. Box 979, Houston, approx. **$41,000.**

†Texas—IMPROVEMENTS—U. S. Eng., Fort Sam Houston, imprvs., ground development, seal-coat, etc., Maverick Co., to Colglazier & Hoff, Inc., 326 Seguin Rd., San Antonio, approx. **$43,600.** CD 11/18—ENR 11/25.

Texas—OIL WELL—K. Evjen & Associates, Seguin, drilling, developing oil well test, 2,500 ft., ground storage facilities, near Guadalupe River, Guadalupe Co., to Bennett & Davenport, Seguin, approx. **$25,000.**

†Tex., Amarillo — AIRFIELD CONVERSION—U. S. Eng., 231 W. Main St., Denison, conversion, A A F, Contr. 41-242-Eng-77, to H. S. Moore, Ada, Okla., **$65,000.**

†Tex., Biggs Field (br. El Paso)—AIRFIELD PAVING, etc.—U. S. Eng., Fort Bliss, addnl. paving, dust palliative, Contr. 29-005-Eng-123, to A. O. Peabody, Santa Fe, N. M., **$36,303.**

Tex., Clairemont—OIL WELL—H. S. Branin, Esperson Bldg., Houston, and L. C. Harrison, Lubbock, drilling, developing new 7,200 ft. test oil well, earthen storage facilities, to Blackwell Oil & Gas Co., Cushing, Okla., over **$25,000.**

Tex., Cumby—OIL WELL—Al. G. Hill & R. B. Campbell No. 1, J. W. Warren, Cumby, drilling, developing 6,000 ft. test oil well, 3½ mi. southwest of here, to Hollandsworth Drilling Co., Longview, approx. **$40,000.**

★ **†Tex., Longview** — AIRPORT GRADING, etc.—Civil Aeronautics Admin., P. O. Box 1689, Fort Worth, airport imprvs., grading, drainage only, to Cook Constr. Co., Jackson, Miss., **$333,815;** paving, to Tobin Quarries, Inc., 220 W. 39 St., Kansas City, Mo., **$443,108.** CD 11/9—ENR 11/11, under LB.

†Tex., Love Field (Br. Dallas)—EXTENSION—U. S. Eng., 231 W. Main St., Denison, constructing extension, Contr. 41-242-eng-83, to Texas Bitulithic Co., 111 Commerce St., Dallas, **$146,407.**

†Utah, Wendover Field—IMPROVEMENTS—U. S. Eng., 31 Exchange Pl., Salt Lake City, temporary frame bldgs. and app. facil. Wendover Army Air Base, Wendover, Tooele Co., to Harrison & Dorman, Inc., 13 S and 4 W Sts., Salt Lake City, **$59,992.**

†Virginia—FACILITIES—U. S., Eng., 1 and Douglas Sts. N.W., Wash., D. C., facilities, Contr. 49-080-Eng-34, Vint Hill Farms, to Blackwell Engr. & Constr. Co., Warrenton, **$34,845.**

†Virginia — PARKING AREA — Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., addnl. plane servicing and parking areas, AAS, Oceana Field, NOY 7276, to Norfolk Paving Co., Norfolk, **$190,275.**

†Wash., Olympia—AIRPORT DRAINAGE—U. S. Eng., 800 3 Ave., Seattle, 4, addnl. drainage at municipal airport, Contr. 45-108-Eng-373, to L. Coluccio Co., 512 21 St., S. Seattle, **$36,377.**

★ **Newfoundland, Buchans (P. O. St. Johns)**—RADIO RANGE STATION, etc.—Dpt. Transport, Ottawa, Ont., addnl. development radio range station and bldgs., to Armstrong Bros., Perth, N. B., about **$536,000.**

LATIN AMERICA

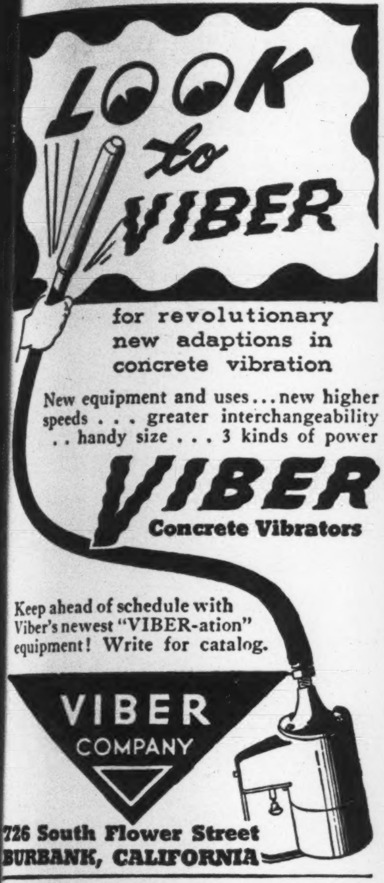
Mexico—State of Nuevo Leon, Central Dpt., Monterrey, plans reconstructing drainage sys. in state. **$452,902.**

Mexico, Culican—State of Sinaloa, Central Dpt., Calican, state public market, to Celso Gaxiola, Culican, **$150,000.** Awarded 11/15.

Mexico, Guadalajara—Dpt. P. Wks., State of Jalisco, Central Dpt., will construct 20 mi. repair work, etc., Lake Chapala Rd., near here, own forces. **$140,000.**

Mexico, Mexico City—District Health Bd., Central Dpt., Mexico City, plans addnl. work on waterworks now underway, bringing in water from Lerma River. **$574,536.**

Mexico, Mexico City—Mexican Govt., Scrita. de Salubridad y Asistencia, Mexico, D. F., plans mental hospital.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PUBLIC BUILDINGS

PROPOSED WORK

†**Ariz., Datelan**—Pub. Housing Auth., NHA, 785 Market St., San Francisco, Calif., plans by Gilmore & Varnez, Security Bldg., Phoenix, 60 family dwelling units, Ariz. 2335. CD 11/19—ENR 11/25.

Ark., Benton—State Bldg. Comn., c/o Gov. Adkins, Little Rock, hospital bldg. $200,000.

†**California** — U. S. Eng., 74 New Montgomery St., San Francisco, Zone 19, addnl. bldg. facilities, Job No. 1250, San Francisco Co.

†**Calif., Alameda**—Home Owners' Loan Corp., 1440 Bway., Oakland, Zone 12, plans by J. H. Meigs, 547 Simon St., Hayward, converting residence at 2212 San Antonio Ave. into 4 living units, Case No. W4D-66. $8,000.

†**Calif., Alameda**—Home Owners' Loan Corp., 1440 Bway., Oakland, Zone 12, plans by E. T. Foulkes, 357 12 St., Oakland, converting second story of tavern at 2410 Lincoln Ave. into 4 living units for in-migrant war workers, Case No. W4D-107. $8,000.

†**Calif., Alameda**—Home Owners' Loan Corp., 1440 Bway., Oakland, Zone 12, plans by I. M. Johnson, 449 MacArthur Blvd., Oakland, converting residence at 1824 Clinton Ave. into living units for in-migrant war workers, Case No. W4D-153. Over $5,000.

†**Calif., Alameda**—Home Owners' Loan Corp., 1440 Bway., Oakland, Zone 12, plans by Reynolds & Chamberlain, 564 Market St., San Francisco, converting bldg. at 1541 Bay St. into living units for in-migrant war workers, Case No. W4D-154. Over $5,000.

†**Calif., Oakland**—Home Owners' Loan Corp., 1440 Bway., Zone 12, plans by A. Farr, 339 San Carlos Ave., Piedmont, converting bldg. at 585 Lake Park Ave. to living units for in-migrant war workers, Case No. W4B-1170. Over $15,000.

†**Calif., Berkeley**—Home Owners' Loan Corp., 1440 Bway., Oakland, Zone 12, plans by J. C. Funk, 402 Jackson St., San Francisco, converting bldg. at 2703 Forest Ave. into living units, Case No. W4-B-1214. Over $5,000.

†**Calif., Berkeley**—Home Owners' Loan Corp., 1440 Bway., Oakland, Zone 12, plans by J. I. Easterly, 2419 McGee Ave., converting bldg. at 2712 Telegraph Ave. into living units, Case No. W4B-600. Over $5,000.

†**Calif., Daly City**—Home Owners' Loan Corp., 1440 Bway., Oakland 12, plans by M. A. Sheldon, 681 Market St., San Francisco, converting residence, 49 Crocker Ave., Case No. W4C-137. $6,000.

†**Calif., Fallbrook**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave, N.W., Wash., D. C., engineering and architectural services by Kistner, Curtis & Wright, 715 Architects Bldg., Los Angeles, in connection with ammunition overhaul facilities, N.A.D., NOY 8260.

†**Calif., Inyokern**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., engineering and architectural services by J. T. Stafford, Oceanside Bldg., Long Beach, Naval Ordnance Test Station, NOY 8167.

†**Calif., Oakland**—Home Owners' Loan Corp., 1440 Bway., Oakland 12, plans by M. A. Sheldon, 681 Market St., San Francisco, converting residence, 592 Jean St., into 4 living quarters, Case No. W4B-1053. $8,000.

†**Calif., Oakland**—Home Owners' Loan Corp., 1440 Bway., Zone 12, plans by J. H. Meigs, 547 Simon St., Hayward, converting residence at 578-30 St., providing 5 living units for in-migrant war workers, Case No. W4B-1245. $10,000.

†**Calif., Oakland**—Home Owners' Loan Corp., 1440 Bway., Oakland 12, plans by A. L. Koue, 525 Market St., San Francisco, converting school residence into living units, W4B-700. $8,000.

†**Calif., Oakland**—Housing Auth. of City of Oakland, 935 Union St., plans by J. J. Donovan, 950 Market St., Berkeley, community facilities bldgs. in connection with housing, Calif. 4749 and 4771, for NHA.

†**Calif., Vallejo**—Housing Auth. of City of Vallejo, Victory Apts., Ryder St., plans by D. H. Horn, Hotel Claremont, Berkeley, central administration bldg. addn., Calif. 4218, for NHA. $30,000.

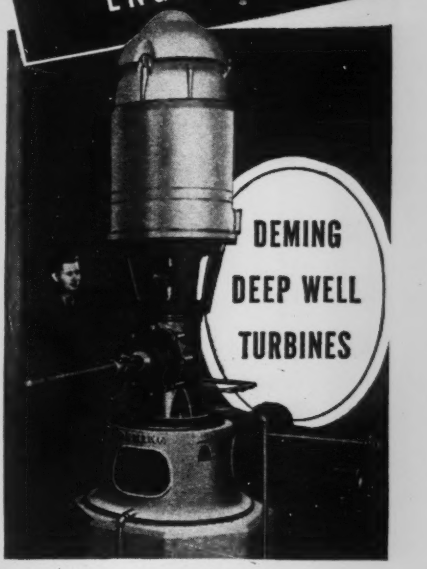
†**Colorado**—Colorado Fuel & Iron Corp., Continental Oil Bldg., Denver, addnl. plant facilities, Pueblo Co. Approx. $110,000. Defense Plant Corp. will finance.

†**Conn., Bridgeport**—Pub. Housing Auth., NHA, 24 School St., Boston, Mass., bids soon gas and watermain repairs, reconstruction, Success Park War Housing, Conn. 6052. H. G. Lindsay, 211 State St., archt.

†**Conn., Naugatuck**—Pub. Housing Auth., 24 School St., Boston, Mass., will not construct site imprvs., Conn. 6209. Project cancelled. Lindsay & Sorenson, 211 State St., Bridgeport, archts.

†**Fla., Port St. Joe**—Pub. Housing Auth., NHA, Georgia Savings Bank Bldg., Peachtree and Broad Sts., Atlanta, Ga., 60 family dwelling units, Fla. 8231.

†**Ind., Anderson**—Home Owners' Loan Corp., 336 N. Wells St., Chicago, Ill., 50 family unit conversion program.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PUBLIC BLDGS. (Proposed Work, Cont'd.)

★**†Ind., Anderson**—Pub. Housing Auth., NHA, 201 N. Wells St., Chicago, Ill., plans by E. F. Miller, Forest Hills, Anderson, and A. M. Strauss, 415 Cal-Wayne Bldg., Fort Wayne, assoc. archts., 250 unit trailer housing, Ind. 12182. $500,000. CD 11/19—ENR 11/25.

†Ind., South Bend—Home Owners' Loan Corp., 336 N. Wells St., Chicago, Ill., 190 family unit conversion program.

†Ind., South Bend—Pub Housing Auth., NHA, 201 N Wells St., Chicago, Ill., 100 unit family housing, Ind. 15-3.

†Iowa—U. S. Eng., 1709 Jackson St., Omaha, Neb., gymnasium at bldg., Clinton Co. $55,000.

†Ia., Clinton—Pub. Housing Auth., NHA, 201 N. Wells St., Chicago, Ill., 75 unit family dwellings.

†Kan., Junction City—City, plans by L. Schmidt, Wichita, hospital addn., Kan. 14-142. **FWA.** $227,000. CD 11/24.

†Louisiana—U. S. Eng., 25 St. and Avenue F, Galveston, Tex., bldg., etc., Sol. No. 41-243-44-C86, Vernon Parish.

†La., New Orleans—Pub. Housing Auth., NHA, 1205 Electric Bldg., 7 and Taylor Sts., Fort Worth, Tex., 500 unit family housing, La. 16100.

†Me., South Portland (br. Portland)—Pub. Housing Auth., NHA, 24 School St., Boston, Mass., brick, school for Mt. View housing, Me. 17038.

†Me., South Portland (br. Portland)—Pub. Housing Auth., NHA, 24 School St., Boston, Mass., bids soon, administration bldg. addn., Me. 17039.

†Me., South Portland (br. Portland)—Pub. Housing Auth., NHA, 24 School St., Boston, Mass., bids soon frame addn. store bldg., Me. 17031.

†Maryland—Pub. Housing Auth., NHA, Temporary Bldg. 2, 19 and D Sts. N.W., Wash., D. C., plans by A. Buckler & Fenhagen, 326 N. Charles St., Baltimore, 200 unit temporary housing, Turner Station, Md. 18253.

Mass., Springfield—City, Supt. Pub. Bldgs., Municipal Bldg., rejected bids Nov. 8, airplane engine-testing unit. Project abandoned by M. W. Maloney, 200 Dwight St., archt. CD 11/4.

†Michigan—Ford Motor Co., 3674 Schaefer Rd., Dearborn, brick, steel, concrete open hearth bldg. for steel plant. Over $150,000. Federally financed. Giffels & Vallet, Inc., 1000 Marquette Bldg., Detroit, engrs. CD 9/29—ENR 10/7.

†Michigan—Lakey Foundry & Machine Co., Muskegon, plant facilities, Muskegon Co. $350,000. Defense Plant Corp. will finance.

★**†Michigan**—Nash-Kelvinator Corp., 14250 Plymouth St., Detroit, addnl. facilities at plants in Wayne and Kent Counties. $830,000. Defense Plant Corp. will finance.

★**†Michigan**—Albion Malleable Iron Co., Albion, plant facilities, Calhoun Co. $1,500,000. Defense Plant Corp. will finance.

†Mich., Detroit—Pub. Housing Auth., NHA, 2073 E. 9 St., Cleveland, O., 220 unit temporary family dwellings, Mich. 20226.

†Mich., Detroit—Pub. Housing Auth., NHA, 2073 E. 9 St., Cleveland, O., plans by Howard Crane & Assoc., Inc., 112 Madison Ave., temporary family housing, Mich. 20141. CD 6/10—ENR 6/17.

Mo., Warrensburg — Warrensburg Clinic, plans by Neville & Sharp, Midland Bldg., Kansas City, medical bldg. Applied for FWA funds. CD 8/27—ENR 9/2.

†Neb., Grand Island—Home Owners' Loan Corp., Woodmen of the World Bldg., Omaha, 53 family unit conversion program.

†Neb., Harvard—Pub. Housing Auth., NHA, Dierks Bldg., 1006 Grand Ave., Kansas City, Mo., will not construct 80 unit housing, Neb. 25065, Bids 11/10 rejected. Project cancelled. Davis & Wilson, 757 Stuart Bldg., Lincoln, archts.-engrs. CD 10/28—ENR 11/4.

†Neb., McCook—Pub. Housing Auth., NHA, 1006 Grand Ave., Kansas City, Mo., will not construct 200 unit family housing. Project cancelled. L. A. Daly, 556 Insurance Bldg., Omaha, archt. CD 11/16—ENR 11/18.

†Nev., Pioche—Pub. Housing Auth., NHA, 785 Market St., San Francisco, Calif., plans by F. Confer, 1700 Financial Center Bldg., Oakland, 30 unit family dwellings, Nev. 26158, and 50 unit family stopgap housing, Nev. 26159. CD 10/20—ENR 10/28.

†New Jersey—General Motors Corp., General Motors Bldg., Detroit, Mich., addnl. plant bldgs., Essex and Union Counties. $300,000. Defense Plant Corp. will finance.

N. J., Newark—Dpt. P. Affairs, City Hall, hospital, nurses' home.

†N. M., Gallup—Pub. Housing Auth., NHA, 1205 Electric Bldg., Fort Worth, Tex., plans by Burwinkle & Springman & Consolidated Architects-Engineers, Capps Bldg., Fort Worth, Tex., 60 unit family housing, NM 29169. CD 11/15—ENR 11/18.

†N. C., Durham—Federal Works Agency, 606 State Planters Bank Bldg., Richmond, 19, Va., bids soon addnl. accommodations for student nurse's at Lincoln hospital, NC 31-274- and NC 31-272. $38,000 gr. approved.

†N. C., Wilmington—Pub. Housing Auth., NHA, Georgia Savings Bank Bldg., Peachtree and Broad Sts., Atlanta, Ga., rejected bids Nov. 12, water distr. sys. addns. for housing, NC 31027, 31029, 31073 and 31074. J. N. Pease & Co., Inc., Johnston Bldg., Charlotte, engrs. CD 10/19—ENR 10/21.

★**†Ohio**—Goodyear Aircraft Corp., Airport, Akron, addnl. facilities at plant, Summit Co. Approx. $620,000. Defense Plant Corp. will finance.

†Ohio—National Advisory Com. for Aeronautics, Cleveland Airport, Cleveland, bids soon (invitational) research bldg. for compressor and gas turbine facilities. E. B. Gulick, Cleveland Airport, Cleveland, engr.

†O., Newark—Pub. Housing Auth., NHA, 2073 E. 9 St., Cleveland, withdrew bids to have been opened Nov. 16, 120 unit temporary family dwellings, Ohio 33285. Will probably abandon project. Columbus Associated Architects & Engineers, 2901 N. High St., Columbus, archts. CD 11/10—ENR 11/4.

★**†Oregon**—Columbia Metals Corp., c/o Bonneville Auth., Exchange Bldg., Portland, plans by Chemical Constr. Co., engr.-archt., 30 Rockefeller Plaza, New York, N. Y., alumina-bearing clay treating plant. $4,096,000. Defense Plant Corp. will finance. CD 10/29—ENR 11/4.

Pa., Darby—Darby Boro School Dist., J. M. Boice, pres., sketches made by L. P. MacKenzie, Otis Bldg., Phila., 1 story, stone, brick, concrete block school. $93,000. Applied to FWA.

†Pa., Phila.—Pub. Housing Auth., NHA, 270 Bway., New York, 7, N. Y., 30 unit permanent family housing units, Pa. 2-9.

Pa., Shenandoah—Dpt. Welfare, Capitol Bldg., Harrisburg, plans by Lacey & Atherton, Hotel Sterling, Wilkes-Barre, altering, imprv. hospital.

R. I., Newport—City, Mayor's Office, City Hall, plans by Charles A. Maguire & Assoc., 1515 Turks Head Bldg., Providence, and bids soon service men recreation bldg., Marlborough Ave. $75,000.

†S. D., Mitchell—St. Joseph Hospital, Mitchell, plans by W. J. Dixon, Mitchell, nurses' training home. $50,000. **FWA.**

†Texas—U. S. Eng., Fort Sam Houston, bldgs., Bexar Co.

†Texas—Defense Plant Corp., 520 Alamo National Bldg., San Antonio, bldgs., etc., Phelps & Dewees & Simmons, 1515 Majestic Bldg., San Antonio, archts. E. W. Staph, 520 Alamo National Bldg., superv. engr.

★**†Texas**—American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, N. Y., addnl. plant facilities, Tarrant Co. Approx. $1,000,000. Defense Plant Corp. will finance.

†Tex., Borger—Pub. Housing Auth., NHA, 1205 Electric Bldg., Seventh and Taylor Sts., Fort Worth, plans by Consolidated Architects & W. C. Townes, Capps Bldg., Fort Worth, 50 trailers, Tex. 41627.

†Tex., Brownwood—Pub. Housing Auth., NHA, 1205 Electric Bldg., Seventh and Taylor Sts., Fort Worth, plans by Hughes & Olds & Consolidated Architects & Engineers, Fort Worth, 36 dormitories, Tex. 41-626. CD 11/11—ENR 11/18.

★**Wash., Buckley**—State Dpt. Finance, Olympia, hospital for treatment venereal diseases. $500,000.

†Wash., Port Orchard—Pub. Housing Auth., NHA, Skinner Bldg., Seattle, Zone 1, plans by Jones, Thiry & Sylliaasen, 715 Hoge Bldg., Seattle, 4, 1 story infirmary bldg.

†Wash., Port Orchard—Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union St., Seattle, Zone 1, bids soon on revised plans converting bldg. into dormitories. $150,000. Bids 11/19 rejected. Jones, Bouillon Thiry & Sylliaasen, 715 Hoge Bldg., Seattle, 4, archts. CD 11/23, under LB—ENR 10/7, under BA.

Wis., Clintonville—City, plans by F. G. Feldhausen & G. C. Coughlen, Columbus Bldg., Green Bay, factory bldg., Hanson Glove Corp., 539 W. Wright St., lessee.

Alaska—State Dpt. Health, Juneau, 2 tuberculosis hospitals, 1 at Juneau and other at Nome or Anchorage. $450,000.

Que., St. Johns—Hospital Hotel Dieu, 217 Longueuil St., plans by J. E. Benoit, 110 Champlain St., wing addn. Hospital Saint Jean. $175,000.

★**Que., Montreal**—Provincial Govt., Hon. H. Perrier, prov. secy., Quebec, school to replace present Jacques Cartier Normal School, Lafontaine Park. $800,000-$900,000.

BIDS ASKED

Bids Asked After December 1

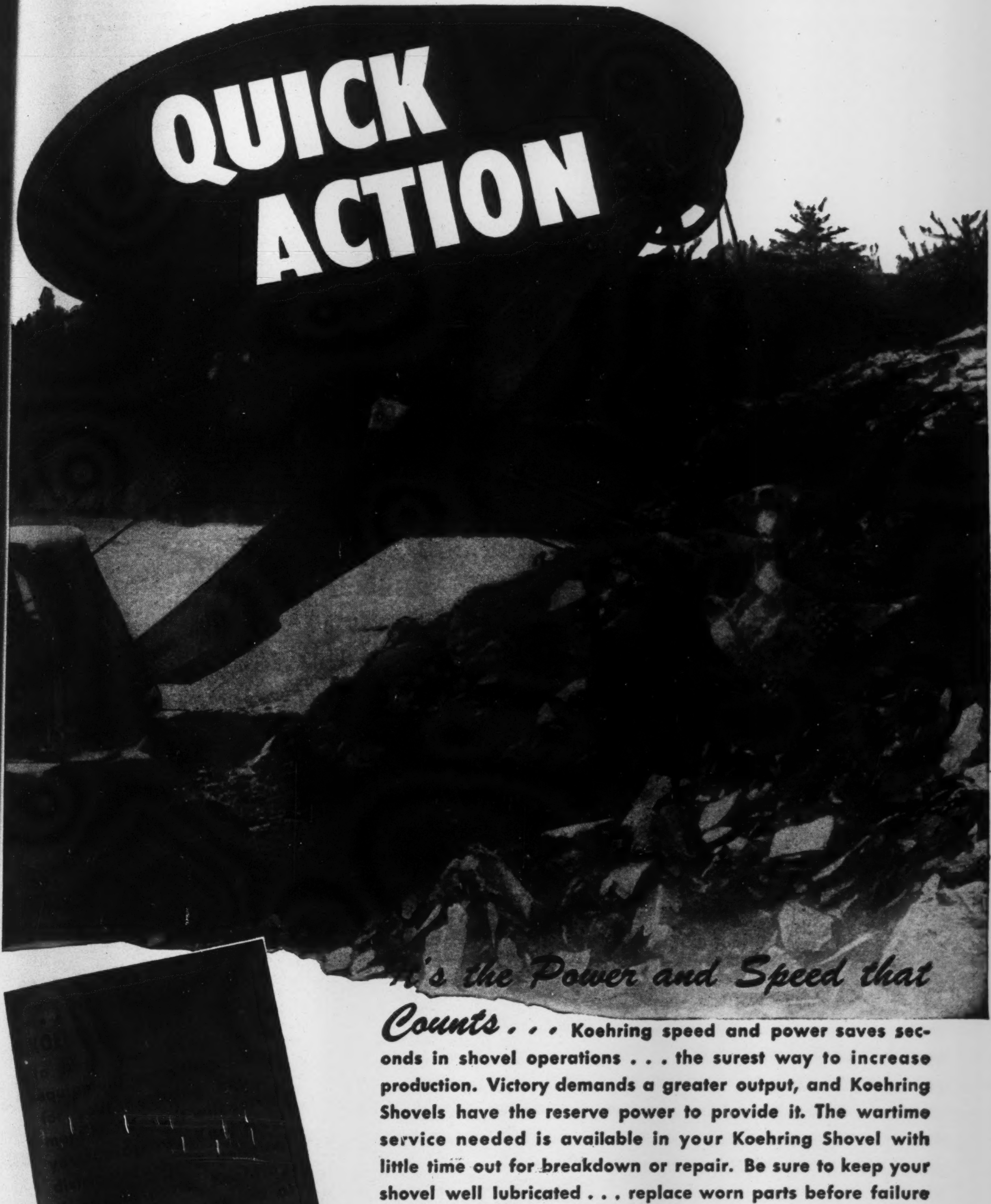
†N. J., Perth Amboy—Perth Amboy Housing Auth., City Hall, yard drainage, rear walks, William Dunlap Homes, NJ 6-1, for NHA. Plans deposit $5. CD 11/11—ENR 11/18.

Bids Asked About December 6

†Md., Aberdeen—Pub. Housing Auth., NHA, Temporary Bldg. 2, 19 and D Sts. N.W., Wash., D. C., 380 unit family housing, Md. 18267, and 24 unit dwellings, Md. 18275. F. L. W. Moehle, 312 Professional Bldg., Baltimore, archt. CD 9/3—ENR 9/2.

Bids Asked December 6

†Conn., Naugatuck—Pub. Housing Auth., NHA, 24 School St., Boston, Mass., 60 family trailer site imprvs., Conn. 6029. Lindsay & Sorenson, 211 State St., Bridgeport, archts. CD 11/24.



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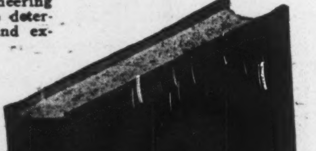

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PUBLIC BLDGS. (Bids Asked, Cont'd.)

†**D. C., Wash.**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., dispensary addn., Naval Communications Annex, Nebraska Ave., NOY 7833. CD 11/4.

†**Md., Edgewood**—Pub. Housing Auth., NHA, Temporary Bldg. 2, 19 and D Sts. N.W., Wash., D. C., 1 story, commercial bldg., concrete fdns. Extended date. Jas. R. Edmunds, Jr., 409 Calvert Bldg., Baltimore, archt. Whitman, Requardt & Smith, 1304 St. Paul St., Baltimore, engrs. CD 11/8—ENR 11/11.

Bids Asked December 7

†**Pa., Bethlehem**—Federal Works Agency, 101 Park Ave., New York, N. Y., school, Pa. 36215. Thalheimer & Weitz, Architects Bldg., Phila., archts. CD 10/13—ENR 10/21.

†**Calif., Stockton**—Home Owners' Loan Corp., 1440 Bway., Oakland, Zone 12, converting bldg. at 33 S. Hunter St., into living units for in-migrant war workers, Case No. W4G-133. Over $5,000. V. Buckley, 155 Sansome St., San Francisco, archts. CD 11/8—ENR 11/11.

†**Conn., Fairfield**—Bridgeport Housing Auth., 252 Hallett St., Bridgeport, recreation bldg., firehouse, Millville and Knapps Hys., incl. grading, road works, utilities, Conn. 6071, for NHA. Plans deposit $50 for first set, and $10 for ea. addnl set. Fletcher Thompson, Inc., 211 State St., Bridgeport, archt. CD 11/10—ENR 11/18.

Bids Asked December 8

†**Ind., South Bend**—Pub. Housing Auth., NHA, 201 N. Wells St., Chicago, Ill., two 1 story, community bldgs., Ind. 12021, K. Schwartz, 230 W. Washington St., archt.

†**Mich., Detroit**—Pub. Housing Auth., NHA, 2073 E. 9 St., Cleveland, O., 280 unit temporary family dwellings, Mich. 20212. Plans deposit $50. Extended date. Malcolmson, Calder & Hammond, Inc., 1217 Griswold St., archts. CD 11/10—ENR 11/18.

Bids Asked December 9

†**Ga., Dublin**—Officer in Charge of Construction, U. S. Naval Hospital, (selected list bidders), nurses' quarters, WAVES barracks, bachelor officers' quarters, 3 married officers' quarters, greenhouse, sentry box, station maintenance bldg., fire station and garage, cooks' mess, attendants' barracks, corpsmen's and civilian technicians' barracks, gatehouse. Spec. 11831.

†**Pa., Birdsboro**—Pub. Housing Auth., NHA, 270 Bway., New York, 7, N. Y., 160 unit family dwellings, Pa. 36440. Plans deposit $50. Eiler & Mast, 147 N. 5 St., Reading, archts. CD 11/17—ENR 11/25.

†**Va., Newport News**—Pub. Housing Auth., NHA, Temporary Bldg. 2, 19 and D Sts. N.W., Wash., D. C., theatre, playground, child care and community bldg., recreation bldg., for housing, Va. 44067. Extended date. Williams, Coile & Pipino, Melson Bldg., Newport News, archts. CD 11/8—ENR 11/11.

†**Va., Norfolk**—Pub. Housing Auth., NHA, Temporary Bldg. 2, 19 and D Sts. N.W., Wash., D. C., special commercial bldg., tenant activity bldg., child care bldg., Va. 44075. A. M. Lublin, Dickson Bldg., archt. CD 11/8—ENR 11/11.

Bids Asked December 10

†**Calif., Berkeley**—Home Owners' Loan Corp., 1440 Bway., Oakland, Zone 12, converting bldg. at 2524 Durant St., into living units for in-migrant war workers, Cast No. W4B-900. Over $5,000. Reynolds & Chamberlain, 564 Market St., San Francisco, archts. CD 11/8—ENR 11/11.

†**Idaho—Pocatello** — Pub. Housing Auth., NHA, Skinner Bldg., Seattle, 1, Wash., 80 unit housing, Idaho 10111. J. P. Jones, Hoge Bldg., Seattle, 4, Wash., archt. CD 11/16—ENR 11/18.

†**N. C. Jacksonville**—Federal Works Agency, 601 State Planters Bank Bldg., Richmond, 19, Va., 2 schools, 1 at Holly Ridge and other, Midway Park, $50,400. A. J. Maxwell, Jr., Goldsboro, archt. CD 10/29—ENR 11/4.

Bids Asked December 14

†**N. Y., Syracuse**—General Hospital of Syracuse, 116 E. Castle St., 2 story, bsmnt., addn. to Lyman Wing, providing dormitory and classroom facilities for student nurses. $174,000. **FWA.** T. W. Gaggin, First Trust Bldg., archt. CD 10/18—ENR 10/21.

Bids Asked December 15

†**Mich., Saginaw**—Pub. Housing Auth., NHA, 2073 E. 9 St., Cleveland, O., 100 unit temporary housing, Mich. 20224. Extended date. O. Winn, Highland Park, archt. CD 11/19—ENR 11/25.

Bids Asked December 23

†**Calif., Richmond**—Federal Works Agency, Pub. Bldgs. Admin., Emergency Operations Units, Wash., D. C., Harry Ells Junior High School bldg., Calif. 4-520. Dragon & Schmidts, 2068 Allston Way, Berkeley, Zone 4, archts. $290,500.

†**Ia., Newton**—Pub. Housing Auth., NHA, 201 N. Wells St., Chicago, Ill., 60 unit family trailers, site development. Keffer & Jones, Masonic Temple Bdg., Des Moines, archts.

PUBLIC BLDGS. (Bids Asked, Cont'd.)

Bids Asked December 24

†**Calif., Vallejo**—Housing Auth. of City of Vallejo, Victory Apts., Ryder St., 1,000 family dwelling units, Calif. 4767. D. H. Horn, Hotel Claremont, Berkeley, archts. CD 11/16—ENR 11/18.

Bids Asked January 11

†**Ala., Tuscaloosa**—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash., D. C., Acute Bldg. 39 and Connecting Corridor 2—38. incl. roads, walks, etc.

LOW BIDDERS

†**Arizona**—U. S. Eng., 751 S. Figueroa St., Los Angeles, 14, Calif., Nov. 20, bldgs., utilities, No. 272, Yuma Co., from Del E. Webb Constr. Co., 302 S. 23 Ave., Phoenix, **$100,000-$200,000.**

†**Ky., Lexington**—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash., D. C., Nov. 23, infirmary bldg. from Hargett Constr. Co., Lexington, **$430,000.** CD 11/26, under LB—ENR 10/21.

†**La., Leesville**—Federal Works Agency, 18 and F Sts. N.W., Wash., D. C., Nov. 24, 1 story, brick hospital, from B. Brezner, Alexandria, **$187,000.** CD 11/9—ENR 11/11.

†**S. D., Provo**—Pub. Bldgs. Admin., 18 and F St. N.W., Wash., D. C., Nov. 26, school, from Northwestern Engineering Co., Rapid City, **$151,700.** CD 11/5—ENR 11/11.

†**Tex., Port Arthur**—Pub. Housing Auth., NHA, 1205 Electric Bldg., Seventh and Taylor Sts., Fort Worth, Nov. 29, 80 family dwelling units, Tex. 41625, from R. P. Farnsworth, Orange, **$343,000.** CD 11/16—ENR 11/18.

†**Wash., Seattle**—Seattle Housing Auth., 825 Yesler Way, Zone 4, Nov. 23, 228 unit housing, Stadium Homes Housing, for NHA, from Macri & Co., 905 10 Ave. S., **$460,960.** CD 10/20—ENR 10/28.

CONTRACTS AWARDED

†**Calif., Morro Bay**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave., N.W., Wash., D. C., facilities for 700 men, etc., NOY 8186, to Austin Co., 16112 Euclid Ave., Cleveland, O.

★†**Calif., San Diego**—Housing Auth. of City of San Diego, Civic Center, 300 temporary family dwelling units, Calif. 4798, for NHA, to Wm. C. Crowell Co., 170 E. California St., Pasadena, **$779,900.** CD 11/5—ENR 11/11.

★†**Calif., San Diego**—Pub. Housing Auth., NHA, 785 Market St., San Francisco, 600 temporary family dwelling units, Calif. 4797, Base Bid 1, from Gorelnik Co., 1220 S. La Brea Ave., Los Angeles, **$1,283,534;** Base Bid 3, from R. J. Daum, 6803 West Blvd., Inglewood, **$1,307,000.** CD 11/5—ENR 11/11.

★†**Calif., San Leandro**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., hospital bldg., NOY 6959, to Monson Bros., 475 6 St., San Francisco, **$2,414,091.** CD 11/23.

★†**Calif., San Pablo**—Housing Auth. of Contra Costa Co., 700 D St., Martinez, 400 family dwelling units, Calif. 4761, for NHA, to Moore & Roberts, 693 Mission St., San Francisco, **$693,396.** CD 11/26, under LB—ENR 11/11.

†**Florida**—U. S. Eng., Grant St. west of Westwood St., Mobile, Ala., bldgs., Okaloosa Co., to M. D. Saxon, Montgomery, Ala., under **$49,000.**

†**Fla., Key West**—Federal Works Agency, 18 and F. Sts. N.W., Wash., D. C., Nov. 18, hospital addn., Fla. 8-906, from The Mackle Co., Key West, **$313,686.** CD 11/1—ENR 11/4.

†**Ga., Augusta**—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash., D. C., Nov. 19, N. P. Infirmary Bldg. 76, from J. D. Hedin Constr. Co., Chesapeake St. and Nicholas Ave. S.W., Wash., D. C., **$345,500.** CD 10/19—ENR 10/21.

†**Idaho, Coeur d'Alene**—Pub. Housing Auth., NHA, Skinner Bldg., Seattle, 1, Wash., 60 unit housing, to B. H. Sheldon, Smith Tower, Seattle, 4, Wash. **$157,894.** Bids 11/191. CD 11/16—ENR 11/18.

★†**Ill., Downey**—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash., D. C., addnl. bldgs., utilities, to Peter Hamlin Constr. Co., 6660 N. Damen St., Chicago, **$1,163,434.** Bids 11/16. CD 11/18—ENR 11/25.

★†**Indiana**—International-Harvester Co., F. McCormick, pres., 180 N. Michigan Ave., Chicago, Ill., brick, concrete, structural steel warehouse, to Indiana Engineering & Const. Co., Inc., 303 Old First Bank Bldg., Fort Wayne, **$1,000,000,** cost plus. Federally financed. Awarded 11/17. CD 11/4—ENR 11/11.

†**Kansas**—U. S. Eng., 10 E. 17 St., Kansas City, Mo., temporary frame bldgs., excav., etc., Sunflower Ordnance Works, Johnson Co., Contr. 23-028-Eng 197, to Jones Hettelsater Constr. Co., Mutual Bldg., Kansas City, Mo. Est. **$427,750.**

Ky., Hopkinsville—W. P. Hogarty, dir. Div. Purchases & Pub. Properties, 230 New State Office Bldg., Frankfort, remodeling existing bldgs., erecting addnl. wing, Western State Hospital to Al. J. Schneider & Co., 1714 Berry Blvd., Louisville. **$232,800.** Bids 11/16, awarded 11/17. CD 10/28—ENR 11/4.

†**La., New Orleans**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., refrigerated storehouse, Naval Station, NOY 7461, to Chris Larsen Co., Maritime Bldg., **$114,665.**

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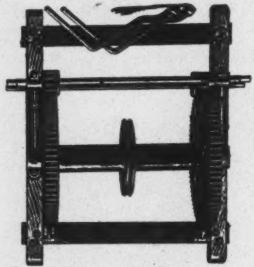

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PUBLIC BLDGS. (Contracts Awarded, Cont'd.)

†Md., Meadows (mail Upper Marlboro)—U. S. Eng., 1 and Douglas Sts. N.W., Wash., D. C., temporary frame bldgs., Contr. 49-080-Eng-25, Camp Springs, to McCloskey & Co., 1620 W. Thompson St., Phila., Pa., **$405,000.**

★**†New Jersey** — Wallington Tube Corp., Wallington, plant bldgs., to Mahony-Troast Const. Co., 657 Main Ave., Passaic, **$1,900,000.** Defense Plant Corp. will finance. CD 11/5—ENR 11/11.

†New Jersey—U. S. Eng., 120 Wall St., New York, 5, N. Y., bldgs., Middlesex Co., to Deakman Wells Co., Inc., 921 Bergen Ave., Jersey City, **$250,000.** Bids 11/22. CD 11/19.

†N. J., Newark—U. S. Eng., 120 Wall St., New York, 5, N. Y., temporary frame bldg., Weequahic Park, Contr. 30-075-Eng. 302, to Walter Kidde Constructors Inc., 140 Cedar St., New York, N. Y., **$476,417.**

†N. Y., Camp Shanks—U. S. Eng., 120 Wall St., New York, Zone 5, temporary frame bldg., alterations, Contr. 30-075-eng-306, to Skinner, Cook & Babcock, Inc., 60 E. 42 St., New York, **$211,748.**

†North Carolina—U. S. Eng., 308 Customhouse, Wilmington, bldgs., Moore Co., to L. B. Gallimore, Greensboro. Est. **$150,000-$200,000.** Bids 11/15.

†North Carolina—U. S. Eng., 308 Customhouse, Wilmington, bldgs., etc., utilities, No. 38-081-44-84, Robeson Co., to Boyle Constr. Co., Sumter, under **$100,000.** Bids 11/16.

†North Carolina—U. S. Eng., 308 Customhouse, Wilmington, bldg. addn.; Iden. 31-075-44-54, Cumberland Co., to R. F. Kirkpatrick & Sons, Burlington, under **$50,000.** Bids 11/4.

†North Carolina—U. S. Eng., 308 Customhouse, Wilmington, addnl. facilities, No. 31-075-44-61, Richmond Co., to L. B. Gallimore, Greensboro, **$152,562.** Bids 11/18.

†North Carolina—American Enka Corp., Enka, research bldg. and spinning bath bldg. extens., to L. L. Merchant Constr. Co., Asheville, **$64,370.** Federally financed. Bids 11/26. CD 11/23.

†N. C., Cherry Point (br. New Bern)—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., facilities for Marine Corps Women's Reserve, M CAS, NOY 7166, to R. N. Thompson, Lawyers Bldg., Raleigh, **$256,831.** Bids 11/13.

★**†N. C., Cherry Point (br. New Bern)**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., 500 unit housing, U. S. Marine Corps Air Sta., NOY 7436, to H. L. Coble, Greensboro, **$1,622,000.** CD 11/22, under CA.

★**†Ohio**—Stauffer Chemical Co., 420 Lexington Ave., New York, N. Y., carbon bisulfide mfg. plant, to Brown & Matthews, Inc., 122 E. 42 St., New York, N. Y., **$800,000.** Federally financed. Awarded 11/19.

†Ohio—Wellman Bronze & Aluminum Co., H. G. Wellman, vice pres. and secy., 2523 E. 93 St., Cleveland, boiler house, coal storage and brick smoke stack, to G. L. Hunting Co., 90 Chester Bldg., Cleveland; heating and boiler equip., to Smith & Oby Co., 6107 Carnegie St., Cleveland. Est. **$77,000.** Defense Plant Corp. will finance. CD 11/9—ENR 11/11.

†O., Cleveland—Pub. Housing Auth., NHA, 2073 E. 9 St., site imprvs. for 140 mobile trailer units, Ohio 33281-B, to W. B. Gibson Co., 200 Chestnut Ave., Warren, **$90,954.** Bids 10/19. CD 9/21—ENR 9/23.

★**†Pa., Allentown**—Allentown Housing Auth., Hanover Acres, 260 unit family dwellings, Pa. 36438, for NHA, to Rubin Const. Corp., 11 W. 42 St., New York, 18, N. Y., **$732,850.** Bids 11/5. CD 11/10—ENR 11/18, under LB.

†Pa., Mechanicsburg—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., temporary repair shop, paved open storage areas 2 and 3 and asbestos fire curtains, NSD, NOY 7871, to Wm. D. Sother, 8352 E. 3 St., Nescopeck, **$86,466.**

†Pa., Munhall—Pub. Housing Auth., NHA, 270 Bway., New York, 7, N. Y., site imprvs. for housing, Pa. 36131, to G. J. Packey Co., 110 Beechwood Ave., Mount Vernon, N. Y., **$233,800.** Bids 10/4. CD 9/30—ENR 9/30.

†S. C., Charleston—Charleston Housing Auth., 20 Franklin St., 4 school bldgs., SC 38-213, to Tri State Constr. Co., 114 Ellis St. N.E., Atlanta, Ga., **$154,000.** Bids 11/16. CD 10/26—ENR 10/28.

†Tex., Brownsville—Pub. Housing Auth., NHA, 2105 Electric Bldg., Seventh and Taylor Sts., Fort Worth, 50 dwelling units, community bldg., site development, gas, water, sanitary sewer outside facilities, Tex. 41-598 and Tex. 7-3, to H. H. Moeller, 1211 Willow St., San Antonio, **$274,900.** CD 11/3.

★**†Tex., Galveston**—Pub. Housing Auth., NHA, 2105 Electric Bldg., Seventh and Tavlor Sts., Fort Worth, thirty-seven 2 story, family dwellings, containing 400 living units, community bldg., Tex. 41614, to Rob. E. McKee, 1918 El Paso St., El Paso, **$714,800.** Bids 1116. CD 11/22—ENR 11/25, under LB.

★**†Tex., Galveston**—Pub. Housing Auth., NHA, 1205 Electric Bldg., Seventh and Taylor Sts., Fort Worth, 500 family dwelling units, facilities, utilities, etc., Tex. 41623, to Knutson Constr. Co., Commerce Bldg., Houston, **$1,127,000.** Bids 11/17. CD 11/22—ENR 11/25, under LB.

†Tex., Texarkana—U. S. Eng., 231 W. Main St., Denison, conversions, Texarkana Ord. Ctr., Contr. 41-242-Eng-47, to United Constr. Co., Dallas, **$293,196.**

†Va., Newport News—Pub. Housing Auth., NHA, Temporary Bldg. 2, 19 and D Sts. N.W., Wash., D. C., road resurfacing, to G. B. Pace, 616 Liberty Trust Bldg., Roanoke, **$57,640.** Awarded 11/19.

UBLIC BLDGS. (Contracts Awarded, Cont'd.)

†Va., Quantico—Yards & Docks, Navy Dpt., St. and Constitution Ave. N.W., Wash., C., addnl. housing for Marine Corps per- onnel, MCAS, NOY 6455, to Mitchell & erkel, 1343 New Hampshire Ave. N.W., ash., D. C., **$340,190.**

Ont., **Eastview (Ottawa)**—Dpt. P. Wks., ttawa, laboratory and cafeteria bldgs. at ational Research Council of Canada, Mon- real Rd., to Doran Constr. Co., Ltd., 78 ank St., Ottawa, **$80,000.**

Quebec — Dpt. National Defense (Sea) ttawa, Ont., addnl. accommodation, incl. ess bldg., boiler house and 2 barracks bldgs., L. G. Ogilvie & Co., Ltd., 2228 Walkley Ave., ontreal, approx. **$400,000.**

Que., **Montreal**—Municipality, c/o J. A. ongeau, city clk., remodeling Bon Secours arket, day labor. **$60,000.** D. Beaupre, ity Hall, archt.

Que., **St. Hyacinthe**—Secy. Dpt. Munitions & upply, Ottawa, Ont., bldgs., Naval Base, to tlas Constr. Co. Ltd., 679 Belmont St., Mon- real. Est. **$150,000.** Bids 6/28 CD 6/14—ENR /17.

COMMERCIAL BUILDINGS

IDS ASKED

Bids Asked After November 30

Wis., **West Bend**—St. Joseph's Hospital, ospital addn., remodeling. $300,000. Briel- aier & Sons Co., 735 N. Water St., Mil- aukee, archts. CD 6/2/42—ENR 6/4/42.

Bids Asked December 8

N. J., **Union City**—Holy Family Roman atholic Church, 560 32 St., altering school. 200,000. F. J. Riker & L. A. Axt, 6115 Hud- on Ave., West New York, archts. CD 11/19—NR 11/25.

ONTRACTS AWARDED

Ala., **Anniston**—McClellan Housing Co., Wil- on Bldg., fifty-four 1 story, 5 room frame esidences, to Smith Constr. Co., 3542 Dayton t., Louisville, Ky. Est. **$200,000.**

Calif., **Palos Verdos**—Rolling Knolls Apts., nc., c/o archt., 85 unit housing, Rolling Knowlls Dist. of Palos Verdes Hills, to Geo. H. Holstein, Jr., 9437 Santa Monica Blvd., everly Hills, over **$150,000.** S. A. Stepanian, 19 Moraga Ave., West Los Angeles, archt.

Calif., **West Los Angeles**—A. Harootunian, 372 S. Holmby Dr., 44 frame, stucco dwell- ngs. Owner builds.

★Conn., **Naugatuck** — G. W. Cassidy, 111 West Main St., Waterbury, 200 housing nits, Field Penn and Quinn Sts. Owner uilds. **$700,000.** CD 10/19—ENR 10/21.

Conn., **Waterbury**—A. & D., Inc., c/o J. E. Kane, archt., 49 Pearl St., Hartford, 43 unit, 4x30 ft., frame residences, Moran St. Owner uilds, **$258,000.**

Ia., **Newton**—Francis B. Dickinson, 906 Park ve., Des Moines, 50 residences, day labor, **250,000-$300,000.**

Me., **Brunswick**—Cumberland Constr. Co., Hawthorne St., Portland, thirty 1½ story, rame residential development, to C. S. Patten, 8 Essex St., Melrose. Est. **$150,000.** Hutchins French, 11 Beacon St., Boston, Mass., archts.

★Md., **Baltimore**—Crescent Development Co., A. Muss, pres., c/o P. Zinman, realtor, 519 arket St., Camden, N. J., ten 2 story, brick partment bldgs., separate contracts. Est. **1,250,000.** B. D. Singer, 921 Bergen Ave., ersey City, archts.

★Md., **Middle River**—Second Middle River Manor, Inc., H. O. Walker, proj. engr., 116 Fidelity Bldg., twenty-seven 2 story brick partment bldgs., to Maryland Constr. Co., /o owner. Est. **$1,000,000.** A. D. Crosett, 12 Fifth Ave., New York, N. Y., engrs.-archts.

INDUSTRIAL BUILDINGS

IDS ASKED

Bids Asked Early in January

Conn., **Norwalk**—FACTORY—Norwalk Tire Rubber Co., Winnipauk, Norwalk, 2 story, 0x100 ft., rein.-con., brick factory. $60,000. letcher Thompson, Inc., 211 State St., Bridge- ort, engr. CD 11/24.

Bids Asked

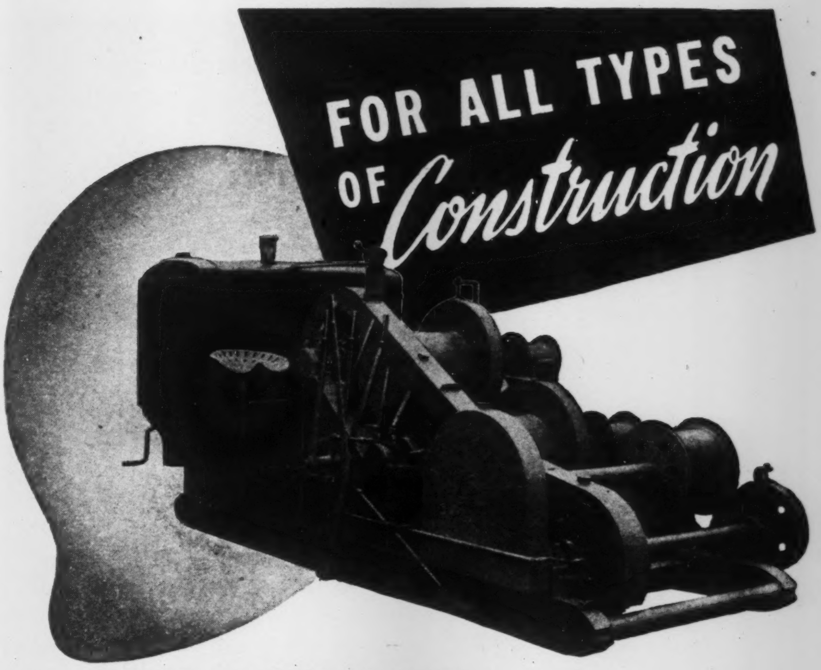
Connecticut—PLANT—Remington Arms Co., nc., Barnum Ave., Bridgeport, (selected idders), powder magazine and chutes, rein.- con.

Mass., **Lynn**—PLANT—General Electric Co., 20 Western Ave., (selected bidders), brick, teel bldg. 96 addn., Western Ave. Over 40,000.

N. J., **Deepwater**—REGENERATOR PLANT —Pure Carbonic, Inc., 60 E. 42 St., New ork, N. Y., regenerator plant bldg. Applied or Defense Plant Corp. funds.

Pennsylvania — MANUFACTURING—H. E. Beyster Corp., engr. and archt., 3-135 General Motors Bldg., Detroit, Mich., converting 1 story brick, steel bldg. into mfg. bldg. for Crucible Steel Co. of America, Midland. A. L. Sonnhalter, vice pres. J. E. Kern, c/o owner, ch. plant engr.

Pa., **Schenley**—DRYHOUSE and BOILER HOUSE—Jos. S. Finch Co., Inc., Schenley, general contract, 2 story 58x65 ft., rein.-con., brick dryhouse and 1 story, 40x60 ft., brick boiler house, incl. one 800 hp. high pressure boiler. C. J. Kiefer, 26 E. 6 St., Cincinnati, O., engr. CD 10/11—ENR 10/14.



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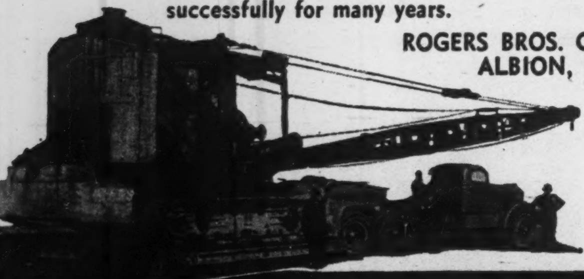

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INDUSTRIAL BLDGS. (Cont'd.)

CONTRACTS AWARDED

Conn., Waterbury—FACTORY—Scovill Mfg. Co., 99 Mill St., factory alterations Bldg. 6 1 story, 90x115 ft. Bldg. 142 addn., stair tower and employees entrance, to W. J. Megin, Inc., 51 Elm St., Naugatuck. Est. **$60,000.**

Ill., Chicago—FACTORY—Galvin Mfg. Co., 4545 W. Augusta, 122x242 ft., brick, rein.-con. factory addn., to Ragnar Benson, Inc., 4744 W. Rice St. Est. **$250,000.** V. L. Charm, 1791 W. Howard St., archt.

Ill., Chicago — FACTORY — Cadillac Motor Car Div., General Motors Corp., Detroit, Mich., 1 story, brick connecting rod factory, incl. present bldg. completion, to R. Benson, 4744 W. Rich St. Est. **$50,000.** V. L. Charn, 1791 W. Howard St., archt.

Ill., Cicero—SYNTHETIC—American Phenolic Corp., 1830 S. 54 Ave., synthetic bldg. addn., to Campbell-Lowrie-Lautermilch Corp., 400 W. Madison St., Chicago. Est. **$60,000.** Burnham & Hammond, 160 N. LaSalle St., Chicago, archts. CD 1/21—ENR 1/28.

Me., Bangor—ENGINE HOUSE, etc.—Maine Central Railroad Co., T. G. Sighrue, ch. engr., 222 St. John St., Portland, repairing railroad bldgs., incl. engine house, freight bldg., train shed, paving freight yard, new 700 ft. loading platform and 1,000 ft. concrete retaining wall, to T. W. Cunningham, Inc., 15 State St. Est. over **$40,000.**

Me., Searsport—PLANT—Summers Fertilizer Co., Stock Exchange Bldg., Baltimore, Md., brick superphosphate plant, to T. W. Cunningham, Inc., 15 State St., Bangor. Est. **$145,000.**

Maryland — FABRICATION SHOP — Maryland Drydock Co., Fairfield, fabrication shop, to The Lacchi Constr. Co., 337 St. Paul Pl., Baltimore. Est. **$40,000.** Bids 11/8. J. E. Greiner Co., 1201 St. Paul St., Baltimore, engr.

Mass., Wakefield — FACTORY — Sylvania Electric Products, Inc., Loring Ave., Salem, altering existing 4 story, 50x175 ft. plant for feeder plant, Lake St., to William A. Berry & Son, 6 School St., Danvers. Est. **$50,000.** CD 10/29—ENR 11/4.

Mich., Detroit—PLANT—Wolverine Tube Co., 1411 Central Ave., brick, rein.-con., steel mfg. plant addn., to F. H. Martin Constr. Co., 955 E. Jefferson Ave. Est. over **$50,000.** Giffels & Vallet, 1000 Marquette Bldg., engrs.

Minn., St. Paul—WAREHOUSE—Brown & Bigelow, University & Syndicate Ave., 20x100 x200 ft., brick, rein.-con. warehouse, 410 Hamline Ave. N., to C. F. Rule Constr. Co., 1281 Taylor Ave. Est. **$70,000.** Toltz, King & Day, 1509 Pioneer Bldg., archts.

Minn., St. Paul — WAREHOUSE — Western Fruit Express Co., O. P. Nelson, genl. agt., 1308 Great Northern Ry. Bldg., 174 E. 4 St., 75x103 ft., frame ice warehouse addn., 922 North Snelling Ave., day labor, **$40,000.**

N. Y., Jamestown—PLANT—Crawford Furniture Mfg. Co., Allen St. exten., 1 story plant addn., to Warren Constr. Co., 335 Steel St. Est. **$40,000.** Awarded 11/18. CD 11/17—ENR 11/25.

N. C., Spencer—BOILER HOUSE—Southern Railway Co., G. L. Sitton, ch. engr. (Eastern Lines), 713 W. Trade St., Charlotte, boiler house, to Blythe & Isenbour, Brevard Court, Charlotte. Bids 10/12. CD 10/5—ENR 10/7.

O., Cleveland — FACTORY — Cleveland Cap Screw Co., J. W. Fribley, pres., 2917 E. 79 St., 1 story, 300x300 ft brick, steel concrete factory bldg., to Sam W. Emerson Co., 1836 Euclid Ave. Est. **$125,000.** Awarded 11/22. H. M. Morse Co., 1500 E. Superior Ave., engrs.-archts. CD 9/14—ENR 9/16.

Pennsylvania—PLANT BUILDINGS—Vanadium Alloy Steel Co., L. S. Potter, purch. agt., c/o Vanadium Steel Co., Latrobe, 2 story, bsmnt., 40x70x100 ft., T Shaped office and laboratory bldg., to Carstensen, Inc., 302 Swank Bldg., Johnstown. Sorber & Hoone, 711 First National Bank, Greensburg, archts.

Wis., Green Bay—WAREHOUSE—N. Rosenberg, 319 N. Jackson St., 1 story, 53x330 ft., brick warehouse, concrete fdn., to Selmer Co., Northern Bldg.

Wis., Green Bay—WAREHOUSE—Wisconsin Wholesalers, Inc., 1200 Velp Ave., 1 story, 44x350 ft., concrete block warehouse, to E. H. Regal Constr. Co., 136 S. Adams St. CD 7/20—ENR 7/22.

Wis., Milwaukee—TRAIN SHED IMPROVEMENTS—Chicago & North Western Ry. Co., B. R. Kulp, ch. engr., 400 W. Madison St., Chicago, Ill., train shed imprvs., to H. Danischefsky, 3440 N. Dousman St. Est. **$75,000.**

Wis., West Bend — WAREHOUSE — Pick Mfg. Co., 133 Oak St., 1 story, 60x200 ft., concrete block warehouse, concrete block fdn., day labor.

Ont., Port Colborne—PLANT—P. C. Iron Works, Ltd., Port Colborne, 80x100 ft., structural steel, brick plant addn., to Smith Bros. Ltd., 1174 Ellen St.

Proposal Advertisements see p. 169 & 170

Postwar Projects see p. 130

SEARCHLIGHT SECTION

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(U. S. Government)

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation, Washington, D. C., November 10, 1943. Sealed bids (Specifications No. 1061) will be received at the office of the Bureau of Reclamation, Friant, California, until 10 a.m., December 10, 1943, and then publicly opened, for furnishing labor and materials and performing all work for the *construction of earthwork and structures, station 1050 + 75 to station 1926 + 90,* Madera Canal, Friant Division, Central Valley project, California. The work is located from twelve miles northwest to fifteen miles north of Madera, California. The principal items of work and the estimated quantities involved are as follows: 747,000 cubic yards of excavation, common, for canal; 7,000 cubic yards of excavation, rock, for canal; 72,500 cubic yards of excavation for core banks; 318,000 station cubic yards of overhaul; 62,000 cubic yards of compacting embankments; 62,000 cubic yards of excavation, common, for drainage channels and dikes; 500 cubic yards of excavation, rock, for drainage channels and dikes; 35,000 cubic yards of excavation, common, stripping of dike foundations and borrow pits; 14,000 cubic yards of excavation, common, for cut-off trench; 87,500 cubic yards of constructing dike embankments; 13,000 square yards of paving on dikes; 1,530 cubic yards of gravel surface on dike crests; 73,500 cubic yards of excavation, common, for structures; 700 cubic yards of excavation, rock, for structures; 43,860 cubic yards of backfill; 5,400 cubic yards of puddling or tamping backfill; 5,880 cubic yards of concrete in structures; 4,700 square yards of dry-rock paving; Placing 832,000 pounds of reinforcement bars; Erecting 251 M. ft. b.m. of timber in structures; Placing 7,700 sq. ft. of asphalt plank on bridge floors; Installing 80 sq. ft. of elastic joint-filler material; Placing 12,000 pounds of metal water stops in joints; Installing 2,400 pounds of blow-off valves and connections; Installing 25 lin. ft. of rubber water stops; Installing 40,000 pounds of gates and gate hoists; and Installing 7,700 pounds of miscellaneous metalwork. This invitation for bids does not cover the purchase of materials which are to be furnished by the Government. Materials to be furnished by the contractor and those furnished by the Government are described in the specifications which will be a part of the contract. The work shall be commenced within thirty (30) calendar days after date of receipt of notice to proceed and shall be completed within four hundred (400) calendar days from the date of receipt of such notice. Guarantee will be required with each bid in an amount not less than 10 percent of the amount of the bid. Performance bond will be required in an amount not less than 50 percent of the estimated aggregate payments to be made under the contract. Payment bond will be required in the sum of one-half of the total amount payable by the terms of the contract. Liquidated damages for delay will be fifty dollars ($50) per day for each uncompleted schedule. Partial payments will be made monthly. No charge to prospective bidders for copies of the specifications and drawings; to others, $3.00 per copy, not returnable. For particulars, address the Bureau of Reclamation, Friant, California; Denver, 2, Colorado; or Washington, 25, D. C.

H. W. Bashore,
Commissioner.

Additional
OFFICIAL PROPOSAL
Advertisements
on page 170

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Section
supplements other advertising in this issue with these additional announcements of products and services essential to efficient and economical operation in the construction industry.
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OFFICIAL PROPOSALS

Official notices of bids wanted on construction and related work, equipment and material for government, state, municipal departments and private enterprises

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(U. S. Government)

(Additional Proposals Continued from page 169)

COMMISSIONERS, D. C., Washington, November 17, 1943. Sealed proposals will be received at Room 509, District Building, until 2:00 P. M., December 7, 1943, and then publicly opened, for performing the work for *the construction of ten million gallon concrete reservoir* in the grounds of Fort Stanton Park. All prospective bidders are hereby notified that any bid submitted in response to this advertisement must be accompanied by a statement of facts in detail of the business and technical organization of the bidder available for the contemplated work, including his financial resources. The Commissioners expressly reserve the right to reject any bid in which the facts as to the business and technical organization, financial resources or experience compared with the project bid upon and based upon past known performance of the bidder justify such rejection. Certified check for $10.00, payable to the Collector of Taxes, D. C., to insure return in good condition, should accompany each request for proposals, specifications, and drawings to the Chief Clerk, Engineer Department, Room 427, District Building. (200)

OFFICIAL PROPOSALS

Bids: Dec. 8, 1943 (195)

State Highway Work

Sealed proposals will be received by the State Highway Department at its office, Dover, Delaware, until 2.00 P. M. E. W. T., December 8, 1943, and at that time and place publicly opened for contracts involving the following approximate quantities:

CONTRACT 833
Slaughter Beach Groins
Slaughter Beach, Sussex Co.
2 — 150 ft. Timber Groins
1400 Lin. Ft. Creosoted Timber Piles
18M B. M. Creosoted Timber Sheeting
4M B. M. Creosoted Timber Wales

Attention is called to the Special Provisions in the proposal, specifications and contract agreement.

Performance of contract shall commence within ten (10) days after execution of the contract and be completed as specified.

Monthly payments will be made for 90 per cent of the construction completed each month.

Bidders must submit proposals upon forms provided by the Department.

Each proposal must be accompanied by a surety bond, certified check, or money to the amount of at least ten (10) per centum of the total amount of the proposal.

The envelope containing the proposal must be marked "Proposal for the construction of State Highway Contract No. ...."

The contract will be awarded or rejected within twenty (20) days from the date of opening proposals.

The right is reserved to reject any or all bids.

Complete sets of plans and specifications may be obtained after November 18, 1943 upon receipt of two dollars ($2.00) for each contract, which amount will not be refunded.

Make checks payable to the State Highway Department.

STATE HIGHWAY DEPARTMENT
By: F. V. duPont, Chairman.
W. W. Mack, Chief Engineer.
Dover, Delaware.
November 10, 1943.

Bids: December 7, 1943 (199)

Rock Spalls and Riprap

Notice is hereby given that The Central Nebraska Public Power and Irrigation District will receive sealed bids for the following work and materials as hereinafter set forth.

GROUP NO. 28D-1

Item No. 1—25,500 tons of rock spalls to be furnished and placed on the face of Kingsley Dam.

Item No. 2—70,200 tons rock for riprap to be furnished and placed on the face of Kingsley Dam.

Item No. 3—19,200 tons rock spalls and rock for riprap to be handled from existing stock piles at the site and placed on the face of Kingsley Dam.

Item No. 4—3,835 cubic yards Portland cement concrete grout to be furnished and placed on the face of Kingsley Dam.

All items tied to make complete job.

A copy of "Instructions to Bidders" and the "Specifications" may be seen at the office of the Secretary of the District or may be obtained on written request of the Secretary. Bidders are presumed to have examined these documents before making a bid.

Bids must be on the form supplied by the District and accompanied either by a certified check, payable to Andrew Jensen, Treasurer, in an amount that is not less than five (5) per cent of the bid, or by a Bidder's Bond, in a like amount, on the form supplied by the District.

Bids shall be filed in the office of the Secretary of the District in the District's office building, 1500 Block West Second Street, Hastings, Nebraska, on or before 11:00 o'clock A.M., Central War Time, December 7, 1943, at which time and place all bids will be publicly opened and read aloud in the presence of the bidders and their representatives.

Bids not received at that time, or bids which are not submitted on the properly prepared blanks strictly in accordance with "Instructions to Bidders" and the "Specifications" may be rejected. The District reserves the right to reject any and all bids and to waive the irregularities in bids.

THE CENTRAL NEBRASKA PUBLIC POWER AND IRRIGATION DISTRICT
By (Seal) Claude B. Miller
Claude B. Miller, President
ATTEST:
(Seal) R. O. Canady
R. O. Canaday, Secretary

Esna Barrage Remodeling

THE EGYPTIAN GOVERNMENT
MINISTRY OF PUBLIC WORKS, CAIRO

The Egyptian Government intends shortly to invite tenders for the remodeling of the Esna Barrage across the Nile in Upper Egypt. The work will comprise the building of about two hundred fifty thousand cubic meters of masonry, mainly in the form of additions to and extensions of the substructure of the Barrage and alterations to the locks. The Government will reserve the right to accept or reject any tender. The drawings, contract and specifications are now being drawn up and can be inspected shortly at the Reservoirs Department of the Public Works Ministry, Cairo, Egypt, and at the office of the consulting engineers, Sir Murdoch MacDonald and partners, 72 Victoria Street, London, S.W. 1, and at the Royal Egyptian Embassy in London and Royal Egyptian Legation in Washington. The exact date of inviting tenders for the adjudication will be advertised later. A visit to the site before tendering by a competent engineer representing the tenderers will be one of the stipulations precedent to the acceptance of the tender. The visit should be made at the risk of each tenderer. (204)

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